The Chemical Age

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The Administrative Chemist

THE chemical industry has always been intensely interested in the subject of education, mainly because chemistry is pre-eminently a profession for trained men. Courses are drawn up, and closely worked to, that are designed—and admirably designed—to produce a chemist or a chemical engineer. The product may not be a finished article; no industrialist would suggest that knowledge without practical industrial experience can lead to that. But at least the product is so well versed in the theory of his chosen vocation that he may be expected quickly to develop into something of high industrial value.

Now comes Professor James Gray, Fellow of King's College, in his Presidential Address to the Science Masters' Association, to suggest—what some may have suspected—that our methods are all wrong. The average scientist, he declared, was by virtue of his training, a relatively simple-minded fellow. In the Professor's view, he is evidently not of much practical account in the exigencies of life. "If we take, at random, a classic, a historian, and a scientist from the same general level of performance at school and at the University," he said, "who of the three strikes us as the least versatile person? . . . . If marooned on a desert island, I should prefer for companionship, an Oxford historian to a Cambridge scientist; if I had to effect appeasement with an intelligent cannibal chief I should prefer to entrust the task to the Professor of Ancient History at Cambridge, rather than attempt to do it myself."

Chemists often indict boards of directors and Government departments because they contain within their ranks few having scientific training. Professor Gray has something to say upon this subject, too. "Speaking from slight personal experience, the failure to introduce scientists into our Government departments is because we ourselves have failed to provide the majority of our candidates with an intellectual training enabling them to satisfy the examiners, not as specialised scientists, but as men of the world. They are often far too simple minded to hold an intellectual fort against the agility of their literary colleagues."

It cannot be denied that industrialists of experience require something more than scientific ability in their administrative and higher executive staffs. That fact was made abundantly clear at the Chemical Engineering Congress, held in London, a few years ago. Engineers have many times expressed the view that the laboratory chemist is unfitted for managerial posts because he has insufficient experience in the ways of the world.

Those who are entrusted with the training of youth all too frequently are, by reason of the work, complete specialists in their subjects and cannot help attempting to make equally complete specialists of their pupils. The fault is not in the individual teacher or professor, because the job of work he is given to do is to impart as much knowledge as will enable his pupil to satisfy the standards raised by the world in general. It is the standards that are too high. This is an age when knowledge grows so quickly that the possibility of yesterday becomes the certainty of to-day, and consequently is included in the examination syllabus of tomorrow. We are expecting so great a volume of knowledge from our young men that, if they are to pass their examination, they have no time to raise their noses from their text-books to look at the world around them.

There is little doubt, moreover, that many employers demand absurdly high scientific requirements from candidates for positions. At least 19 graduates out of every 20 never require to use again three-quarters of the knowledge they so laboriously acquire. It is quite enough if the student has a firm grasp of scientific principles. It will be time enough to go into details when he is engaged in a specific industry. No doubt it is very desirable that knowledge of chemistry or physics should be as profound as possible. But the human being has his limitations, and the time appears to have come to ask ourselves whether industry desires narrow specialists who cannot be entrusted with work outside their own particular sphere, or whether it desires men of wide education and personality able to take their place in the affairs of the world. British industry has been built up by practical men, and though the pure scientist should not be discouraged for a moment to specialise in his science if his bent lies that way, it is becoming evident that in that direction does not lie the route to high industrial position. Professor Gray laid emphasis upon the need for a width of reading and culture that should extend beyond the subject of science.

Except in the case of analytical chemistry, which in itself is one of several tools in the hands of the investigator and manufacturer, chemistry needs must be regarded as a phase of natural science, which for successful application must co-ordinate the resources of the widest understanding of natural law. The truth of this view is apparent to everyone who has endeavoured to apply science to industry.

—*W. H. Hatfield.*

NOTES AND COMMENTS

British Factories for Refugees

A RESULT of the tragic expulsions from Central Europe is seen in the number of foreign manufacturers who are attempting to set up factories and continue their business in this country. For example, it is reported that in the past two months over sixty business men, mainly from Germany, have been negotiating with the Tyneside Industrial Development Board on this question, the manufacture of chemicals being among the varied types of industries which it is desired to establish. In the main, this tendency can only be beneficial. Setting aside, humanitarian considerations, which in any event would hold the movement to be most commendable, there would be several results of direct practical advantage. As in the majority of cases the foreign industrialist will not bring workers into his enterprise, except in the case of a few key men, the proposed factories would absorb an appreciable volume of British labour (this should be insisted upon). They would also add to the general industrial productivity of the country, thus contributing to its wealth and adding some weight in the right scale of the import-export balance.

More at Work

TIME was when the Ministry of Labour issued periodical returns of the number of persons unemployed. It was an excellent example of how not to do it. When the National Government was formed the right way was found. This was not to gloss over the number of those who were unemployed, but to publish at the same time the number of those who had actually got jobs. What it means to be able to see both sides of the picture is shown by the figures taken in mid-December. As compared with November the unemployment total was slightly up, but so was the employment total to a greater degree. Actually in mid-December there were 12,263,000 persons in employment in this country. This is a very remarkable total when the season and some of the attendant circumstances are taken into account. It is an excellent augury for 1939, for which, generally speaking, the prospects are wonderfully bright.

The Future of U.K. Trade in India

THE Department of Overseas Trade's report on the condition and prospects of United Kingdom trade in India (see page 24) shows that the import trade in chemicals has made great advances, but gives a warning to U.K. export interests covering the more distant prospects of this trade. In the first place, the Government fostering of indigenous industries has reduced several of the leading United Kingdom export trades to India to comparative extinction. Equally damaging to the United Kingdom's export trade, have been the high revenue duties, raised as a temporary and emergency measure to meet the financial crisis of 1931, which have had a protective effect that was never intended and have stimulated the establishment of a large number of miscellaneous domestic industries. The high level of duties has induced leading United Kingdom manufacturers to supply the market from their Indian factories. Imperial Chemical Industries, Ltd., formed a special Indian manufacturing company to produce soda ash, caustic soda and chlorine while one or two rival Indian concerns are also turning their attention to heavy chemicals. The report poses the question as to how it will be possible to make good the gradual decline and possible extinction of imports of such magnitude as cotton textiles, iron and steel, chemicals, soap, etc., which have hitherto been the mainstays of United Kingdom trade with India. It is stated that a partial solution of the problem will be found in the rapid development of the country which is already resulting in a remarkable diversification of her economic requirements. But the report gloomily adds: "Indian public men, both politicians and industrialists, seem to be imbued with the conviction that the more domestic production is substituted for imports until the latter are gradually extinguished, the more prosperous the country will become."

Prospects of the Scottish Shale Oil Industry

ONE of the principal difficulties encountered by the Scottish shale oil industry has been the competition through the technical progress made in petroleum production. It was realised that this old-established industry could not continue unless it received financial assistance, in spite of the drastic economic measures taken by the industry itself. Governmental aid, afforded mainly because of the importance of the industry in the event of war, has done much to lift it from its depressed state of a few years ago. And now there are encouraging signs of its further revival. Our Scottish correspondent reports that the first steps have been taken to resume shale-mining to the north of Philipstoun, and a new mine is being sunk between that point and South Queensferry, while two are in progress to the South of Broxburn. At the same time, additional seams are being opened up in existing mines. Of course, some time must elapse before the full fruits of these developments are reaped, but it is noteworthy that as a direct result of the progress made it has been found possible to place a number of men, formerly employed on the "spread-over system," on a full-time working basis.

Support for the Five Day Week

THE proprietors of THE CHEMICAL AGE have received a further batch of letters from firms which are also operating the five day week. The general opinion is that this experiment has entirely justified itself. "When we first contemplated taking this step," states a firm in Carlisle, "fears were expressed that our production would suffer and that our labour costs would increase. The reverse has happened, and although new machinery has helped, we are satisfied that in the increased efficiency of our workers through the long week-end we have gained very materially." A Liverpool manufacturer commends the benefits of free Saturday, "especially to those who are doing the brain work and taking the responsibility." A well-known London firm makes the very good point that the time spent in travelling from home to the office and back makes the total effort expended on Saturday mornings unjustifiably high in comparison with the amount of work done. "The psychological effect of that fact on the staff cannot be otherwise than bad." In planning to celebrate the twenty-first anniversary of their five day week, the publishers of THE CHEMICAL AGE must emphasise that they do not favour curtailing production, but believe that by careful adjustment as much work can usually be performed in five days as in five and a half. The dangers of merely reducing hours without regard for output have been illustrated recently in France.

Comparative Efficiency of Metallic Driers and Their Compound Efficiency in Drying

By
R. L. DATTA, D.Sc., and ASHUTOSH DAS, M.Sc.

THE investigation described below was undertaken with a view to evolving a suitable drier for the manufacture of varnishes. The investigation involved, in the first instance, the determination of the optimum concentration of the more common metallic driers thereby settling the order of efficiency of the metals as different workers have disagreed in their experimental results in this respect.

Fokin (*Seif. Zeit.*, 1907, *34*, 821) placed the metals in the order shown in the list below, beginning with the strongest drier :

Co, Mn, Cr, Ni, Fe, Pt, Pd, Pb, Ca, Bi, Ba, Hg, U, Cu, Zn.

Macky and Ingle (*J. Soc. Chem. Ind.*, 1917, *36*, 319) classified the metals in the following order of drying power :

Co, Mn, Ce, Pb, Cu, Fe, U, Na, Ag, Zn, Hg, Al.

Meiter has also arranged the metals in the following order of drying :

Mn, Pb, Zn, Ca, Cu, Co, Fe, Pt, Ag, Sr, Cd, Ni, Au, Al, Mg, Ba, Sn, Cr, Hg, Bi.

V. S. Kiseler and L. I. Norina (*J. Chem. Ind. Russ.*, 1933, No. 4, 22-27) gave the order as Ca, Mn, Ca, Pb.

Secondly, the present investigation was directed towards the evolution of compound driers having the maximum possible drying efficiency. It is known generally that a mixture of driers gives a better drying efficiency without the drawbacks of any one individual drier such as colour, surface film, etc.

The problem was examined more closely from a practical point of view with cobalt, manganese, lead and iron and with combinations of these metals, two at a time, three at a time and all of them together in order to assess the different degrees of increase in the drying efficiency through the influence of the metals upon one another.

Preparation of the Linoleate Driers

The experiments were carried out with the linoleates of the metals. These were prepared by adding an aqueous solution of the salts of the metals to equal quantities of sodium linoleate also dissolved in water. Sodium linoleate was prepared by neutralising pure linoleic acid with the requisite amount of caustic soda. The precipitated linoleates were washed thoroughly with water and finally dried on the water-bath for two hours and stored in stoppered phials before use.

To obtain reliable results, the direct method of dissolution of known weights of driers was discarded as many uncertainties creep in, while the determination of undissolved driers is well nigh impossible and if possible, is likely to be inaccurate. The procedure followed was the indirect method. Known weights of driers, say from $\frac{1}{2}$ to 7 per cent., were dissolved in raw linseed oil at 160° C. and the clear oil off the undissolved drier was tested until the maximum efficiency was attained. This usually declines again as the quantity of drier is further increased. At the stage of maximum efficiency, the oil was analysed and its metal content determined. Though the metal content is different for each metal due to different solubility, the experiments furnish reliable data on the order of efficiency, taking into consideration the quantity of metal involved in each case.

The following results were obtained on experiments conducted under the same conditions of temperature, humidity and using the same thickness of oil for the drying test as these factors are known to modify the drying time. The temperature of the experiments was 25° C. and the humidity between 60-67 per cent.

Drier.	Quantity of drier taken for dissolution in raw linseed oil at 160°C. (per cent.)	Metal content estimated. (per cent.)	Period of drying (hours).
Cobalt linoleate ..	1	—	7
" " ..	2	0.05	2
" " ..	3	—	$2\frac{1}{2}$
Manganese linoleate ..	0.5	—	$6\frac{1}{2}$
" " ..	1	0.08	5
" " ..	2	—	7
Lead linoleate	1	—	28
" "	2	—	25
" "	3	—	22
" "	4	0.58	17
" "	5	—	18
Iron linoleate	1	—	34
" "	2	0.41	28
" "	3	—	31

It will be seen that the periods of drying decrease gradually with increase in the amounts of drier until the maximum efficiency stages are reached and then on further addition of drier, the efficiency is found to fall and the periods of drying begin to increase. The oil at the point of optimum efficiency was used for all subsequent experiments.

The optimum efficiency of drying is as follows :

Metal.	Metal content (per cent.).	Period of drying (hours).
Cobalt	.05	2
Manganese ..	.08	5
Lead	.58	17
Iron	.41	28

The order of efficiency is therefore :

Co > Mn > Pb > Fe

The Driers in Combination

With a view to finding out the most suitable combination of the driers investigated for attaining the maximum possible drying efficiency, a further series of experiments was undertaken. The procedure was to take equal volumes of the oils containing the driers at their optimum efficiency and these were mixed two, three and all four at a time. The drying times of their films are tabulated below and shown against their aggregates of drying times had there been no increase of efficiency.

Combination of metals at their optimum efficiency.	Aggregate value of drying times on the basis of individual driers.	Actual period of drying (hours).	Increase of efficiency over aggregate value of drying times.
Co, Pb	$9\frac{1}{2}$	$1\frac{1}{2}$	6.3
Co, Fe	15	$2\frac{1}{4}$	6.6
Mn, Pb	11	$2\frac{1}{2}$	4.4
Co, Mn	$3\frac{1}{2}$	$2\frac{1}{2}$	1.4
Mn, Fe	$10\frac{1}{4}$	$6\frac{1}{4}$	2.6
Pb, Fe	$22\frac{1}{2}$	22	1.0

The experiments were carried out at a temperature of 31° C. and humidity 56-58 per cent.

The following table gives the experimental results of the metals taking three at a time and also all four at a time.

Combination of metals at their optimum efficiency.	Aggregate value of drying times on the basis of individual driers.	Actual period of drying (hours).	Increase of efficiency over aggregate value of drying times.
Co, Mn, Pb	8	$1\frac{1}{2}$	6.4
Co, Pb, Fe	$15\frac{3}{4}$	$1\frac{3}{4}$	9
Co, Mn, Fe	$11\frac{3}{4}$	$2\frac{1}{2}$	4.6
Pb, Mn, Fe	$16\frac{3}{4}$	$2\frac{3}{4}$	6
Co, Mn, Pb, Fe	13	$1\frac{1}{2}$	8.6

On examining the efficiency of the driers two at a time, it will be seen that metals falling in the same group of the Periodic Classification have very little mutual action in increasing the drying efficiency. Co and Mn falling in the same group show very little advancement (1.4 times) and Pb and Fe similarly falling in the same group show no increase in the drying efficiency, being the same (namely 1). The

combination of two metals from different groups has been found to increase the drying efficiency in a marked manner. Co and Fe which belong to different groups show 6.6 times increase in the efficiency and Co and Pb show 6.3 times, Mn and Pb 4.4 times and Mn and Fe 2.6 times.

When the driers are used three at a time, a still further increase in the drying efficiency is noticed, though the drier percentage remains the same per unit oil. In these combinations, no retardation of drying efficiency is noticed and any combination is satisfactory for attaining a good efficiency. In the case of Co, Mn and Pb, the peak efficiency of 1¼ hours is an advance of 6.4 times. A combination of Co, Pb and Fe gives the best increase of efficiency, viz., 9 times. In the case of all four metals in the combination giving the peak efficiency, the drying period is slightly retarded though the increase in the efficiency is 8.6 times the theoretical aggregate value.

It is interesting to note that the metals which possess defects of colour, surface drying, etc., show optimum efficiency at very low percentages so that these defects will not make themselves evident in commercial practice when they are used in combination with proportionately larger quantities of Pb and Fe.

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New Condensation Catalyst

Use of Hydrogen Fluoride in Alkylating Aromatic Hydrocarbons

THE use of hydrogen fluoride as a catalyst for condensations in organic chemistry has been developed by Simons, Archer and Adams (*J.A.C.S., 60,* 2,952-2,958). Hydrogen fluoride has been found to be an excellent catalyst for the alkylation of benzene and other aromatic hydrocarbons, either by direct condensation with olefines, or by reaction with alkyl halides. Good yields were obtained in all cases, though no special precautions were observed in order to obtain optimum conditions, and the HF was not specially dried. The method employed was to distil the HF into a copper reaction vessel, into which was then introduced benzene and the olefine or alkyl halide. Most of the reactions proceeded smoothly at 0° C., but a somewhat higher temperature was necessary in the case of secondary and tertiary alkyl halides. In the case of the alkylation of aromatics with alkyl halides, hydrogen fluoride has definite advantages over the catalyst normally employed—aluminium chloride—in that no polymerisation of the aromatic hydrocarbon occurs, and also, high melting substances such as naphthalene can be dissolved in a solvent such as carbon tetrachloride, and the reaction carried out in this solution, which is not possible when using aluminium chloride.

As examples of the applications of the new catalyst, may be quoted the alkylation of benzene with propylene, yielding 84 per cent. of monoisopropylbenzene; with isobutene, yielding 42 per cent. each of the mono- and di- tert-butylbenzenes; with trimethylethylene, giving 21 per cent. of the mono-, and 62 per cent. of the di- derivative; and with cyclohexane, producing 62 per cent. of cyclohexylbenzene. Normal propyl bromide gave 48 per cent. of propyl benzene, but isopropyl chloride and benzene produce a polymerised hydrocarbon. Tert-butyl chloride gave with benzene 10 per cent. of the mono- and 60 per cent. of the di- derivative; with toluene 75 per cent. of the mono- derivative resulted; while from naphthalene was obtained 46 per cent. of the mono- and 8 per cent. of a di- derivative, together with 36 per cent. of another di-derivative isomeric with the first. An interesting result was that the product of the reaction between benzene and cyclopropane consists entirely of *n*-propyl benzenes: 42 per cent. mono-, 20 per cent. di-, and 3 per cent. of tri-. A similar effect is obtained when aluminium chloride is used as a catalyst, and this is held to indicate that the alkyl halides ionise before reaction.

PLASTIC MATERIAL FROM SILK WASTE

A new type of plastic material, made from silk refuse and scrap left over in silk spinning, has been produced by the Japanese firm of Katakura and Co. The scrap is soaked in about 10 per cent. of its volume of water in order to soften it, and then kneaded to produce a mass in which the fibres are thoroughly interlaced. This mass can then be shaped in heated moulds. The resultant pieces are light, elastic and oilproof. They have a high electric insulating capacity and a great resistance to heat, being able to stand up under temperatures of 130° C.

Bussey Coal Distillation Co., Ltd.

Failure Caused by "Gross Mismanagement"

AT the first meeting of creditors and shareholders under the compulsory liquidation of Bussey Coal Distillation Co., Ltd., last week, a statement of affairs presented showed liabilities of £35,753, against assets of £1,355, and an issued capital of £280,000.

The chairman reported that the company acquired a process for treating coal for the extraction and recovery therefrom of oil, gas, etc. The company erected at Glenboig, Glasgow, 14 retorts, together with coal and coke handling plant. In January, 1932, an offer of £500 for a ninety-day option for the purchase of plant at Glenboig for £20,000 was received from Mr. Stanley Grove Spiro, and the offer was accepted by the board. The option was exercised in May, 1932, and the plant was sold to Scottish Gas Utilities Corporation, Ltd., for £20,000. According to the accounts prepared by the company's auditors, a net loss of over £300,000 was made from the formation of the company in 1928 until June, 1938.

Official Receiver's Opinion

In the opinion of the Official Receiver, the failure of the company was primarily due to gross mismanagement on the part of the original directors, in that they permitted the company to procure a licence at a cost of £85,000 and to erect and equip plant at Glenboig which cost approximately £144,000, without making provision for adequate working capital which was required to enable the company to demonstrate the commercial merits of the process. A resolution was passed for Mr. Forbes George, C.A., to act as liquidator of the company.

DECAY OF TIMBER AND ITS PREVENTION

A small pamphlet issued by the Department of Scientific and Industrial Research (Forest Products Research Records No. 7, published by H.M. Stationery Office, price 6d. net) deals with the decay of timber and its prevention. In this country, decay is brought about mainly by attack by fungi, but in the tropics, white ants are an equally important enemy of timber. "The extensive substitution for wood of other materials resistant to decay has occurred principally because it has not been realised that wood can economically be made completely resistant to the destructive agencies," the report states. "Wood pit props have now been replaced largely by steel props for supporting the roofs of the more permanent roadways in coal mines, principally because the untreated wood props decayed so rapidly. It has now been shown that the life of wood props can be extended at least 5-10 times by a simple inexpensive open tank treatment with a solution of sodium fluoride or zinc chloride. In Great Britain, where timber is not particularly cheap and where labour costs for replacement work are high, calculation will nearly always show that protection by wood preservative treatment of all timber liable to fungal decay is most definitely a paying proposition."

Letters to the Editor

The Five Day Week

SIR,—We are extremely interested in anything which deals with the welfare of our employees, and we are pleased to give you the following information.

Our experience of a "Five Day Week" has been limited to the last two years, except for the foundry where it has been in operation for many years. During the last two years the works have been closed entirely on Saturdays and there has only been a small skeleton staff in the offices to deal with urgent correspondence. Prior to adopting the "Five Day Week" we worked 47 hours. We now work five days of 9 hours each, making a total of 45 hours, and the men receive the same pay for the reduced number of hours.

During 1937 at the time of the introduction of the "Five Day Week" and throughout the year, we were extremely busy, and 1938 has seen the biggest output in the history of the company. We are satisfied, however, that there has been no reduction in efficiency.

Both men in the works and staff greatly appreciate the long week end, and both they and the management are extremely satisfied with the results.—Yours faithfully,

Peterborough. BAKER PERKINS, LTD.
January 5, 1939. A. I. Baker, Director.

Digestion of Coir Fibre

Efficiency of Sodium Sulphide as Pulping Agent

A SUCCESSFUL procedure for the digestion of coir fibre from coco-nut husks has been developed in the laboratory by Menon (*J. Inst. Textile Ind., 29*, 1,285-1,295). The fibre, which was obtained from nuts from the Malabar coast and was separated from the husks by retting in brackish water (this process having been found more satisfactory than a chemical one), was digested in a stainless steel autoclave of 750 ccs. capacity with various reagents, mostly at temperatures from 150-170° C.

It was found that water at 170° has a strongly disintegrating action on the fibres, causing decomposition of the pentosans, and solution of a very small part of the lignin. The residue is very coarse and harsh. Sodium hydroxide was found to be a satisfactory pulping agent. When the residue from digesting with this reagent was less than 60 per cent., a satisfactory brown paper could be made from the product. Residues of less than 47 per cent. of the original fibre yielded, after bleaching, a white paper of good quality. Sodium sulphide was also a good pulping agent, being, in molecular terms, more efficient than the hydroxide, and yielding a finer residue of shorter fibres. When used in the same concentration as the hydroxide, the colour of the product was about the same as that produced with soda, but in high concentration the sulphide pulp compared favourably in colour with the soda pulp.

With both reagents, the yield of residue increased gradually with increase of the ratio of reagent to fibre, up to a maximum, and then decreased rapidly to a final limiting value. The amount of lignin in the residue fell continuously with increase in concentration of the pulping agent, but in high concentrations a finite limiting value of the lignin content was attained, indicating that complete delignification could not be obtained. The furfural content of the residue rose to a maximum and then slowly fell. Even in concentrated soda the furfural content, however, was 10.7 per cent., whereas that of ordinary cellulose is about 4-6 per cent., indicating that furfural is here very tightly bound to the cellulose.

An interesting feature was that although the yield from sodium sulphide treatment was higher than from soda treatment, the use of a mixed bath gave a lower yield than would be obtained with either of the two components separately. (This refers to 14 grams of reagent, either pure or mixed, acting on 60 grams of fibre). The minimum yield from a mixed bath, was attained in one containing 11 g. soda and 3 g. sulphide.

Death of Professor G. Barger

A Famous Research Worker on Alkaloids and Natural Products

PROFESSOR GEORGE BARGER, M.A., D.Sc., F.R.S., Regius Professor of Chemistry in Glasgow University since 1937, died suddenly on January 5 from heart failure at Aeschi, Switzerland, where he was on holiday.

Professor Barger, who was 60 years of age, was educated in Holland, at University College, London, and at King's College, Cambridge, of which he was a fellow from 1904 to 1910. His first academic appointment was as demonstrator in Brussels University from 1901 to 1903, after which he spent six years as chemist in the Wellcome Physiological Research Laboratories. In 1909 he became head of the chemical department at Goldsmiths' College, London, leaving five years later to become Professor of Chemistry at the Royal Holloway College. For the duration of the Great War he was chemist on the staff of the Medical Research Committee (Department

of Biochemistry and Pharmacology). In 1919 he was appointed Professor of Chemistry in Relation to Medicine at Edinburgh University and in that year he was also elected a Fellow of the Royal Society. He succeeded Professor G. G. Henderson as Regius Professor of Chemistry at Glasgow University in October, 1937.

In 1928 Professor Barger visited the United States as Baker lecturer at Cornell University and as Dohme lecturer at John Hopkins University. The following year he took part in the proceedings of the British Association at Cape Town as president of the Chemistry Section. In 1934 he received the Hanbury Medal from the Pharmaceutical Society and two years later, the Longstaff Medal from the Chemical Society.

Professor Barger will be specially remembered for his noteworthy researches on alkaloids and other natural products, in recognition of which he was awarded the Davy medal by the Royal Society. He was an honorary and corresponding member of various foreign chemical societies and his degrees were M.A. (Cambridge), D.Sc. (London), doctor, *honoris causa*, of Padua, hon. D.Sc. (Liverpool), hon. M.D. (Heidelberg), LL.D. (Michigan), and hon. Dr. Pharm. (Lausanne). He contributed many papers to scientific journals on chemical and biochemical subjects, and he published various works, among which were "The Simpler Natural Bases," 1914; "Some Applications of Organic Chemistry to Biology and Medicine," 1930; "Ergot and Ergotism," 1931; and "Organic Chemistry for Medical Students" (second edition), 1936.

THE Solvay concern is to build a new soda factory on Czechoslovakian territory, the works at Nestomitz being now on the German side of the frontier.

U.K. Trade in India

"Phenomenal Advance" of Chemical Imports Continued

AFTER a period of almost uninterrupted improvement, India's economic conditions sustained a sudden reversal in 1937, although healthy activity was shown in the production and imports of chemicals, according to a report issued by the Department of Overseas Trade (H.M. Stationery Office, 4s. 6d. net), on the conditions and prospects of United Kingdom trade in India in 1937-38. (Revised to September 30 last).

The iron and steel industry had enjoyed the most prosperous year in its history. Pig iron production rose from 1,552,000 tons to 1,644,000 tons, and exports from 574,600 to 629,000 tons. The Indian cement industry had taken full advantage of the increased activity of the past year. The formation of the Associated Cement Companies of India, a merger of the ten principal concerns under unified control, brought the policy of the industry into the hands of a single powerful organisation, which was expected to effect considerable economies in working. Imports last year had shrunk to under 32,000 tons.

During the past ten years, scores of new industrial enterprises had been inaugurated in India which were swelling the total and increasing the variety of her production. They were, moreover, displacing the imports which had hitherto been obtained largely from the United Kingdom, and which had provided a steady Customs revenue for the Government of India. In some important cases notably, for example, the manufacture of soap, paints and certain chemicals, these industries were branches of important firms in the United Kingdom and elsewhere, who had decided that it was to their advantage to meet the Indian demand from works situated inside the tariff wall and also to be in a position to claim the status of Indian origin when tendering for the requirements of Government purchasing departments.

Elasticity in Demand for Chemicals

Imports into India in 1937-38 of chemicals, drugs and medicines were valued at Rs. Crores 5.69, an increase of Rs. Crores 1.16, as compared in 1936-37, and Rs. Crores 0.72 as compared with 1935-36. The activity and prosperity of Indian industries were responsible, however, for the major part of the improvement in imports. After stating that from April 1, 1937, following the separation of Burma from British India, the Accounts of the seaborne trade of the latter included the trade of British India with Burma, and from the same date excluded the direct foreign trade of Burma with countries other than India, the report states that the phenomenal advance in the imports of chemicals into India continued. The 1937-38 total of Rs.3,33 lakhs was over Rs.60 lakhs in advance of the figure for the previous year, Rs.84 lakhs above the pre-depression total, and no less than 3½ times the value of the average of the last five pre-war years. This elasticity in the demand for chemicals was a sure sign of the progressive growth of the textile, paper, glass, soap and a host of miscellaneous Indian industries in which chemicals constituted a raw material of manufacture. It was also a result of the ceaseless sales, service and research activities of the admirably organised United Kingdom and German groups, whose representatives were constantly fostering demand and seeking new outlets. The most noteworthy event during the year was the flotation of an Indian manufacturing company controlled by Imperial Chemical Industries, Ltd., to develop on a large scale the alkali deposits in the Punjab, and to erect works near Calcutta for the production of caustic soda, chlorine and other products. The Tata group were also considering alkali manufacture on a large scale, and were planning important developments of the chemical by-products at their steel works at Jamshedpur. While the effect of these additional sources of supply might be expected to limit the future market for the United Kingdom manufacturer, the progressive industrialisation of India would probably be on such a scale as to absorb the output from both sources.

Although United Kingdom exporters had enjoyed a record year in the Indian market, their percentage share had slightly fallen from the level of 1936-37, and was two points below 1935-36. By contrast, Germany had slightly improved her position, and Italy had more than regained the ground lost during the period of the Abyssinian war. It was satisfactory that the United Kingdom supplied the whole of the increased supplies of carbonate of soda amounting to Rs.9 lakhs (total supply: Rs.60 lakhs). In 1936-7 "other countries" included Kenya Colony (Rs.3¼ lakhs), Japan (Rs.1.8 lakhs), and the U.S.A. (Rs.1.75 lakhs). Imports from Japan had steadily declined since the peak of 1934-5, United Kingdom prices having been lowered to meet Japan's competition. In 1936-7 the average declared price of Japanese carbonate was Rs.4.09 per ton, and in 1937-8 Rs.3.96 per ton.

The following table shows the total imports under the remaining principal headings:—

	1936-7. Rs. (lakhs).	1937-8. Rs. (lakhs).
Acids	9	10
Ammonia and salts thereof	11	10
Bleaching powder	9	13
Carbide of calcium	7	6
Caustic soda	37	43
Copper sulphate	3	5.5
Disinfectants	7	8
Dyestuffs	2,61	3,43
Glycerine	1	1
Potassium chlorate	6	7
Sodium bicarbonate	6	5.5
Sodium bichromate	3.6	4.6
Borax	2.6	3.6
Sodium silicate	3	2
Sodium hydrosulphate	4	14
Sodium sulphide	2	3
Sulphur	22	26

Business in Soaps and Paints

Regarding the imports of soap, the report states that the effects of the erection of works in India by the leading United Kingdom producers, coupled with the establishment of scores of small soap factories all over the country, sheltering under a revenue duty of 25 per cent., were clearly shown in the import figures, which had fallen from a total of Rs.1,67 lakhs in 1929-30 to Rs.24 lakhs in the year under review. The leading United Kingdom group was now producing most of its standard brands of household and laundry soap in India.

Aggregate imports of paints and colours at Rs.75 lakhs showed a reduction of Rs.2 lakhs on the 1936-7 year's figures, and of Rs.39 lakhs when compared with the pre-slump total of Rs.1,14 lakhs in 1929-30. The half-dozen modern paint works in India, controlled by prominent United Kingdom manufacturers, were extending their production. Japanese competition had been checked as a result of a rise in Japanese prices, coupled with heavy minimum specific duties on red and white lead, zinc white and other moist paints. German competition was mainly in coloured dry, Paris blue and lithopone dry. The U.S.A. competed in the high-grade paints, mostly coloured dry and coloured moist. The preferential rate of 10 per cent. was of considerable advantage. In 1936-37, the United Kingdom supplied 32 per cent, and the U.S.A. 40 per cent. of the turpentine. The United Kingdom provided virtually the whole of the small quantities of turpentine substitute. The important trade in varnish was shared by the United Kingdom (85 per cent.), Japan (7 per cent.), Germany (2 per cent.), and Holland, Belgium and the U.S.A., who were responsible for lesser values.

Supersulphate Cement

A Product with Excellent Mechanical Properties and High Chemical Resistance

SUPERSULPHATE cement, the result of recent research in cement manufacture, is a product which presents excellent mechanical properties combined with exceptional resistance to chemical corrosion. It combines the mechanical properties of the best Portland cement with the chemical properties of alumina cement, the high cost and large heat of hydration of which render it difficult to use.

The cement is prepared from a base of blast furnace clinker, granulated by rapid chilling. To this a small quantity of slaked lime and a larger quantity of calcium sulphate are added. In principle the sulphuric anhydride (SO_3) content should be over 5 per cent.; in practice it is considerably over this figure. Various laboratories give the following compositions:—

	Faija laboratory, London.	Koning and Bienfait, Amsterdam.	Ponts et Chaussées laboratory, Paris.
Insoluble material	0.66	1.94	0.10
Soluble silica	26.04	26.21	25.90
Alumina	11.56	13.31	13.30
Ferric oxide	0.75	1.67	0.85
Ferrous oxide	0.90	—	—
Titanium oxide	—	0.36	—
Manganese oxide	2.13	1.71	1.70
Lime	45.16	43.06	45.60
Magnesia	2.72	3.10	2.54
Sulphuric anhydride	7.13	6.82	8.30
Sulphur (as sulphides)	1.13	0.88	1.05
Loss on heating (water, carbon dioxide)	1.64	0.77	1.10
Elements not determined	0.74	—	0.88

Absence of an Excess of Lime

It is generally said that blast furnace cement resembles either Portland or alumina cement. The more calcium there is in the cement, the more closely it resembles Portland; and the less calcium present the more it resembles alumina cement. It is the lime in Portland cement which accounts for its comparatively poor chemical resistance and the low percentage of lime in supersulphate overcomes this objection. The reason for this lies in the chemical reactions occurring in the cement during the process of setting. Lafuma has laid down the principle that whenever the three substances, lime, calcium sulphate and alumina, are found together in aqueous solution, a tricalcium sulphoaluminate is formed. This will comprise 3 molecules of calcium sulphate no matter what the proportion of the substances, and the reaction will continue so long as one of the substances has not been entirely combined. However, if the tricalcium sulphoaluminate is formed while the alumina is in solution, the reaction results in the formation of crystals, which are perfectly stable. On the other hand, if the tricalcium sulphoaluminate is formed when the alumina is no longer in solution, the result will be a powder which expands and causes the cement to crack.

In ordinary cements there is an excess of lime after completion of the reaction, and when they are put into the presence of water containing a sulphate, the same reaction which took place during setting will be continued between the alumina and the lime in the cement, and the sulphate in the water, resulting in the formation of powdery tricalcium sulphoaluminate, and the disintegration of the cement. In supersulphate cement there is no excess of lime, as it is completely used up at the end of the setting reaction. On the other hand there is an excess of alumina in the soluble state and of calcium sulphate. When this cement is put into water containing sulphates it no longer reacts as the cement still contains an excess of sulphate. In the presence of water containing lime, the cement will react by absorbing the lime and forming additional stable crystals of tricalcium sulphoaluminate.

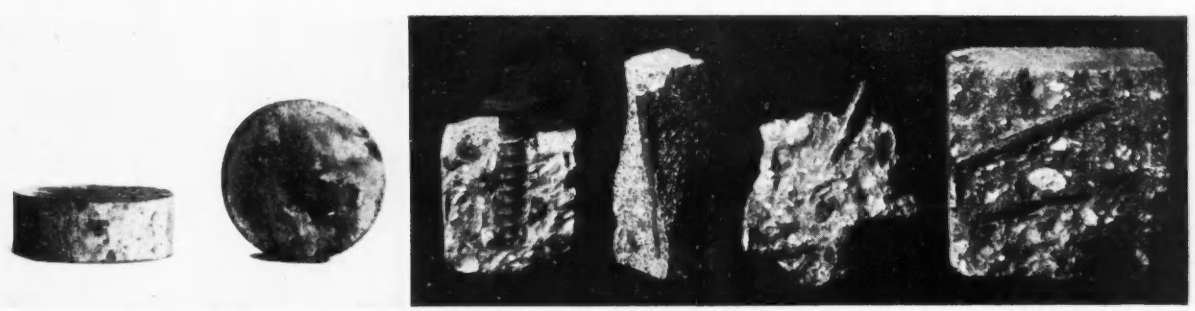
Tests of Chemical and Physical Properties

Tests carried out by the laboratory of the Société Anonyme des Ciments de Thieu on samples of their supersulphate cement (sold under the trade name of Sealithor) confirm this. A sample block was subjected for five years to the standard Le Chatelier-Anstett test for chemical resistance without being affected in any way. Similar samples of high quality Portland cements would be in a state of advanced decomposition at the end of three or four months.

Resistance of the Sealithor supersulphate cement to the action of sea water (which is only a specific case of attack by sulphates in solution) has been tested by the Belgian Administration of Roads and Bridges for the Ministry of Public Works. Piles were driven into the beach at various points along the sea shore in such a position that they would be exposed both to the effect of the sea water and to that of the tides. It was found that the surface of the piles was actually hardened by the effect of the sea water, through the formation of additional crystals of tricalcium sulphoaluminate as already explained.

Absence of lime in supersulphate cement once it has set also saves the cement from the deleterious effect of saponifiable oils and greases. With normal cements, these oils act on the free lime and form soaps which cause the cement to disintegrate through the destruction of one of its elements.

Apart from these chemical characteristics, the cement has interesting physical properties. Important among these is the fact that the cement expands very slightly on setting



Left: the condition of supersulphate cement sample after a five-year Chatelier-Anstett test for chemical resistance. Right: conservation of iron rods and screws sunk in concrete made from supersulphate cement.

instead of contracting as do most Portlands. The expansion amounts to 0.089 mm. per metre which is not enough to cause trouble, but enables pieces to be cast very exactly to required dimensions. Supersulphate cement also presents a much higher degree of impermeability than Portland or alumina cement. The concrete laboratory of Ghent made tests on this point. Whereas a sample of supersulphate cement showed no permeability to water having been subjected for 3 hours to a pressure of water amounting to 15 atmospheres, Portland cement samples were permeated by pressures of 3 atmospheres for 10 minutes and alumina cement by a pressure of one atmosphere in two or three minutes. This quality is of twofold interest. In the first place, it provides a cement when especially waterproof construction is desired, and in the second, iron reinforcements in the concrete made from this cement are rust-protected.

The mechanical strength of supersulphate cement is also greater than that of either Portland or alumina cement. Tests carried out by the laboratories of the Municipality of Paris show it to have a resistance to crushing of 315 hectopiezes for samples aged 28 days, while similar samples of high resistance Portland cement give only 300 hectopiezes. Similar tests were made by the laboratory of the Free University of Brussels on samples allowed to set one day in a moist atmosphere and kept for 27 days in water. The results gave a resistance to compression of 642 kilograms per sq. cm. for supersulphate cement, 500 kilograms for high resistance Portland cement and 575 kilograms for rapid setting Portland cement. The resistance to tractile strains of the same samples was 44.5, 30 and 32 kilograms respectively.

New Technical Books

VITAMINE UND HORMONE UND IHRE TECHNISCHE DARSTELLUNG. Part I. Ergebnisse der Vitamin- und Hormonforschung. By Dr. H. Bredereck & Dr. R. Mittag. 2nd edition. pp. 138. Leipzig. S. Hirzel. R.M.7.

With no evidence of slackening in the output of papers in this field, the second edition of the monograph by Brederick & Mittag (the first edition was reviewed in these columns on July 25, 1936, p. 80) will receive a cordial welcome from biochemists. Additional matter covers the research literature up to the latter end of 1937, including new work on the biological significance of lactoflavin (vitamin B_2), the specificity of vitamins B_3 and B_4, the nature of the vitamin E complex, the all-important question of the relations between vitamins and ferments and the stereochemistry of androstandiol and other compounds in the steroid group. In such a well-documented work it is disappointing to find no bibliography of the work on vitamin H (skin-protective vitamin) and vitamin K (antihæmorrhagic vitamin). Also surprising is the omission of any reference to the significance of nicotinic acid as part of the vitamin B complex.

THE PHASE RULE AND PHASE REACTIONS. By Sydney T. Bowden. Pp. 303. London: Macmillan and Co., Ltd. 10s.

This monograph has been written for students who require a brief exposition of the principles and applications of the phase rule, and is intended to serve both as a theoretical and practical text-book. The author has presented a straightforward account of the subject, bearing in mind the problems which may confront a student in the examination room and laboratory. Too much detail has been avoided by the adoption of simplified schemes of classification for various systems, and diagrams have been prepared so that they may easily be reproduced. A uniform system has been preserved throughout; thus presssure is always represented by the ordinate, concentration always by the abscissa, and temperature as abscissa or ordinate according to whether it is a *pt*- or *tc*-diagram. The pictorial summaries provide a further innovation which should prove helpful. There are sets of questions at the close of each chapter which have been selected from actual examination papers.

OPTICAL PYROMETRY (Optische Pyromerie). By Professor Dr. Fritz Hoffman and Dr. Carl Tingwaldt (Sammlung Vieweg-Tagesfragen aus den Gebieten der Naturwissenschaften und der Technik, Heft 115). Pp. 134. Friedr. Vieweg & Sohn, Braunschweig, RM 9.

Pyrometry is one of the scientific questions which is becoming of increasing importance, and for high temperatures optical pyrometry is more interesting still. The two authors have collected some very up-to-date material on the subject, which makes this little book very interesting and to be warmly recommended.

A view of the Treforest Trading Estate, South Wales, on which work began two years ago. A description of some of the amenities of the Estate and of its progress since its foundation was published in last week's issue (page 7).

British East Africa's Chemical Imports

United Kingdom's Position Maintained

THE value of chemicals, drugs, dyes and colours imported into British East Africa during 1937 totalled £338,743 as against £271,203 in 1936 according to a report issued by the Department of Overseas Trade (H.M. Stationery Office, 1s. 6d. net). Imports from the United Kingdom totalled £219,068 as against £184,169 in 1936, from Germany £41,504 (£32,570), and from the U.S.A. £17,018 (£13,507). The position of the United Kingdom was well maintained, German competition again being most in evidence in medicinal preparations.

Imports of disinfectants and insecticides were valued at £69,851 as against £58,208 the previous year. United Kingdom imports increased in value from £40,247 to £46,860, Belgium, alone among the other principal competitors, securing an increased share of this trade. Cattle and sheep dipping preparations, mainly for use in Kenya, were imported from the United Kingdom to the value of £6,357 out of a total importation valued at £6,395, while imports of paints and varnishes from the United Kingdom were valued at £57,723 out of a total value of £67,752. U.K. manufacturers retained their hold on this trade, which is mainly in paints of cheap quality. The value of imported drugs, medicines and medicinal preparations increased from £96,118 in 1936 to £118,398 in 1937. Increased German participation was a feature of this trade in 1937. Imports from Germany into Kenya and Uganda rose from £5,847 in 1936 to £13,985 in the past year. In Tanganyika Territory the relative positions of the United Kingdom and Germany underwent only slight change in favour of Germany, the respective figures in 1937 being £20,908 and £12,979.

The only chemical product exported from British East Africa in any quantity is sodium carbonate, of which 41,330 tons were exported from Kenya and Uganda as compared with 46,549 tons in 1936.

COAL STRUCTURE DETERMINED BY LEAD SALT DIFFUSION

The possibility of revealing the structure of coal by allowing aqueous solutions of lead salts to diffuse in, so as to render the salient points of the structure opaque to X-rays, has been investigated by Beeching (*Jour. Inst. Fuel*, 1938, *12*, 61, 35-39; also 1938, *11*, 240). The method of study was to cut a pillar of coal parallel to the bedding planes and to stand it in a solution of lead acetate and nitrate having a density of 2.54. At various intervals the pillar was removed, the excess solution wiped off and an X-ray reflection picture taken. It was found that coals differ enormously in their porosity to the lead solution; in general, dull coals absorb the solution readily, allowing it to penetrate right into the coal substance, whereas bright coals permit diffusion only along the main cleavage planes and cracks.

PRESERVATIVES FOR BUTTER AND MILK

That citric acid and sodium citrate reduce the loss of fat in butter milk to a minimum and that they also improve the flavour, aroma and the keeping quality of butter is the conclusion arrived at as a result of laboratory investigations carried out recently at the Imperial Dairy Institute, Bangalore, India.

An experiment to find out the most suitable preservative to be used for sending milk samples over long distances for analysis and the optimum quantities required to keep the samples in good condition was also undertaken. Formalin, chloroform, thymol, hydrofluoric acid, boric acid, mercury perchloride, potassium chromate, etc., were tried under different conditions of temperature and transport. Formalin in the proportion of 6 drops per 100 c.c. of milk was found to be most suitable to keep the milk in good condition for about 10 days.

Death of Mr. A. W. Knapp

A Chemist of International Reputation in the Cocoa and Chocolate Industry

THE death of Mr. Arthur W. Knapp, chief chemist of Cadbury Bros., Bournville, on January 6, at the age of 58, removes a figure of international reputation from the cocoa and chocolate industry. He was a Birmingham man, and was educated at King Edward's Grammar School, Aston, and at Birmingham University. He graduated B.Sc. of Birmingham and London in 1901, and M.Sc., Birmingham, in 1928. In 1903 he passed the examination for the Associateship of the Institute of Chemistry, becoming a Fellow in 1906. He was also a member of the Institution of Chemical Engineers.

He held appointments in public analysts' departments in London (where he did work for Mr. (now Sir) George Newman), in Belfast and in Birmingham, and in the research laboratory of Lever Bros., Ltd. In 1911 he became research chemist to Cadbury Brothers, Ltd., and in 1925 was appointed chief chemist. While occupying these last mentioned posi-

tions, he carried out much research work of great importance to the industry as a whole, was the author of standard works on cocoa and chocolate, and of numerous scientific papers published in British and foreign technical journals. His knowledge of the problems of the cultivation and fermentation of cacao made him an authority whose views were sought by growers and manufacturers in many parts of the world, and gained for him, in 1935, the Medaille de Merite de l'Office Internationale du Cacao et du Chocolat. He spent some time in the plantations of both the West Indies and the Gold Coast. He held a high place in his own profession, having served on the Councils of the Institute of Chemistry, the Society of Chemical Industry, the British Association of Chemists (of the local sections of all of which he had been chairman), the Society of Public Analysts, and of the Midland Chemists' Committee, of which also he had been chairman.

Besides his so widely recognised scientific attainments, Mr. Knapp was endowed with considerable artistic sensibilities and literary skill. He was an accomplished amateur actor and producer, and a witty and knowledgeable writer on many matters outside his own profession. His non-scientific writings included an essay on Nietzsche, the German philosopher, two or three plays, and humorous and critical contributions to various journals. He was a member of the Fabian Society.

One of his colleagues writes: "His energy, courage, enthusiasm, and skill, in every work to which he set his hand, were unbounded, and his devotion to his work, to his profession, and to the interests of his brother chemists, particularly to those less fortunate, may well serve as an example to all."

Kyanite

A Natural Aluminium Silicate for Refractories—Empire Supplies

KYANITE, a natural silicate of alumina (Al_2SiO_5 or $Al_2O_3.SiO_2$), is finding a steadily growing market for the preparation of refractories. It is not used in the raw state but is first fired at 1,450 to 1,500° C. and then ground ready to mix with the bond. This preliminary firing completes a large volume change which would otherwise take place on burning and shatter the brick; it also converts the kyanite into a mixture of mullite and silica according to the equation:

$$3(Al_2O_3.SiO_2) = 3Al_2O_3.2SiO_2 + SiO_2$$
Kyanite — Mullite

The product of calcination, however, is known in the trade as "sillimanite," a misnomer which often leads to confusion. Sillimanite and andalusite are other natural minerals of exactly the same chemical composition as kyanite (but differing in physical properties) and both are likewise converted on heating into mullite and silica. The conversion of andalusite into mullite is not accompanied by any change in volume and this mineral can therefore be used in the raw state as a refractory. Up to cone 20 sillimanite may also be used in the natural state, but in order to produce a body of constant volume it would be necessary to fire it previously well above cone 20 (1,530° C.).

Of the three natural minerals, however, kyanite is much the most important commercially, and this is largely due to the fact that it occurs in really large and easily workable masses capable of affording a considerable and steady supply of material of uniform grade. Again, kyanite changes into mullite at the lowest temperature of the three and owing to the manner in which the resultant mullite crystals interlock it is believed that kyanite gives a stronger mechanical body than andalusite. In sillimanite and andalusite the mullite crystals develop parallel to the direction of the *c*-axis of the original crystal, but in kyanite the mullite needles grow inwards, perpendicular to the surface of the original grains.

Mullite made from kyanite is used in the construction of numerous types of furnaces, including electric furnaces and those for the enamelling and glass industries. When added to ceramic compositions containing clay and kaolin it is claimed to reduce shrinkage, lower the coefficient of expansion, increase breaking strength, resistance to abrasion and electrical resistance, and extend the sintering range. It is useful for the manufacture of kiln furniture, and balls for grinding mills can be made of it which are truly spherical as well as tough and hard. In the form of special plastic cements it can be used for setting, patching, and repairing furnace brick work.

Indian kyanite is the most popular at the present time, considerable quantities being imported into the United Kingdom where it is calcined and supplied in various grades and mixtures. Recent discoveries made in Nyasaland by the Geological Survey Department suggest that alternative supplies of kyanite may become available from that country, and it is reported that the Nyasaland deposits have attracted the attention of a South African mining firm. In addition to Nyasaland, there are deposits of kyanite in British East Africa which may perhaps be regarded as potential resources, though a commodity fetching about £5 a ton delivered at United Kingdom ports does not afford a commercial proposition unless transport and other charges are low and there is sufficiently large and steady demand. Samples of kyanite of good quality from a deposit said to have been recently discovered in Kenya have been received at the Imperial Institute, and although details are not available, the producer claims that he could make shipments at the rate of 100 tons a week, provided the demand and price obtainable were to warrant it. In Western Australia, kyanite is extremely abundant in the Chittering Valley, 40 miles from Perth. (From *Bull. Imp. Inst., 36,* 493-498.)

RECENT TRADE LITERATURE

HEAD, WRIGHTSON AND CO., LTD., have published a folder which contains photographs of plant installed by the company. The cover illustration shows a blast furnace built by them at the Ebbw Vale works of Richard Thomas & Co., Ltd.

A leaflet showing a few typical chemical stoneware products suitable for use in the food industries has been published by DOULTON AND CO., LTD. The list is not intended to be complete but merely illustrates the possibilities of the material in this particular field.

The heating of factories by steam or hot water is dealt with in a leaflet published by the SPIRAL TUBE AND COMPONENTS CO., LTD., who claim that their Mark II series Spiral Tube Unit Heater is the most economical method of such heating. The heater element in the apparatus is composed of the "Spiral Tube," an all-copper gilled tube of high efficiency. These tubes are securely fixed into welded mild steel headers, and the element assembled in a fabricated steel casting.

JICWOOD, a new type of material which is claimed to fill the gap existing between wood and metal, has been created by JICWOOD, LTD., Weybridge, Surrey, who have issued a folder describing its properties. There are two types of material, the compressed Samsonow Jicwood and the Impregnated Jicwood. The latter is distinct from the former in that it is lighter and has qualities which differ greatly from the compressed material. Jicwood is claimed to be eminently suitable for the chemical industry in the manufacture of containers, laboratory benches, etc.

The very nature of molasses makes the measurement of the weight in large tanks, by the method of dipping, very difficult, but the Pneumercator tank gauge manufactured by KELVIN, BOTTOMLEY AND BAIRD, LTD., measures weight directly (according to Bulletin J.110 recently issued by the company in connection with direct pressure type gauges specially designed for molasses storage tanks) and takes the foam at its liquid value. It automatically takes account of the air content, and measures weight in the normal straight sided tanks whatever be the specific gravity. The company has also issued a bulletin (J.107) dealing with Pneumercator gauges in industry.

Pattern cards issued by IMPERIAL CHEMICAL INDUSTRIES, LTD., relate to two new additions to the company's dyestuffs range. Caledon Yellow 5 GKS is a new vat dyestuff, of special interest to calico printers. It yields excellent prints on cotton, viscose and cuprammonium rayons and silk fabrics, and is suitable for dyeing silk to produce fast boiling shades. Soledon Brilliant Orange 6 RS Paste is of interest for the dyeing of wool, primarily for the production of pale to medium reddish orange shades of excellent all round fastness; for the dyeing of silk and for the dyeing of spun mixtures of wool and viscose rayon. Methods of using this dyestuff for the printing of wool and silk fabrics are described in the pattern card.

GEORGE H. ALEXANDER MACHINERY, LTD., have issued details in a leaflet of the new Continental band filing machine designed by their principles, Continental Machines, Inc., U.S.A. In America this new machine already has a considerable vogue among the manufacturers of high-grade test tools, and it is claimed that the trimming of punches and dies can be carried out effortlessly and at the minimum expense in any case where the aperture of the die is big enough to permit the insertion of the file. Its chief advantage lies in the fact that with the continuous filing system the backstroke of the file is eliminated, thereby improving the finish of the product and adding considerably to the lift of the file. The company have also issued, on behalf of the Wilson Mechanical Instrument Co., Inc., New York, a chart showing the approximate relationships between hardness values determined on "Rockwell" and "Rockwell Superficial" hardness testers, and values determined on other testers.

Personal Notes

MR. JAMES FREDERICK WHITE, of Leeds, manufacturing chemist, left estate valued at £81,172 (net personalty £78,569).

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MR. A. D. OWEN has resigned from the board of directors of British Industrial Plastics, Ltd., because of the many other calls upon his time.

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MR.. DAVID TINNION, chairman of Henry Kenyon and Co., Ltd., chemical manufacturers, Warrington, left estate valued at £17,593 (net personalty £17,502).

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MR. WALTER GEORGE MARSKELL, B.Sc., who is in charge of the chemical and metallurgical laboratories of Babcock and Wilcox, Ltd., at Renfrew, was married last week, at Glasgow, to Miss Catherine Sommerville Sinclair.

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SIR FRANK E. SMITH, G.B.E., K.C.B., D.Sc., LL.D., F.R.S., will relinquish on January 31, his appointment as secretary to the Committee of the Privy Council for Scientific and Industrial Research. Sir Frank, who is 62, was awarded the G.B.E., in the New Year's Honours List. He is relinquishing his post three years before the compulsory retiring age to become adviser to the Anglo-Iranian Oil Company on scientific research and development. The King has approved the appointment of PROFESSOR E. V. APPLETON, D.Sc., LL.D., F.R.S., to succeed Sir Frank Smith. Professor Appleton is at present Jacksonian Professor of Natural Philosophy in Cambridge University, and Fellow of St. John's College, Cambridge, and will take up his new appointment on February 1.

Sir Frank E. Smith, F.R.S.

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MR. JAMES BROWN, Ph.C., who for some forty years has been head of the "Tabloid" manufacturing department at the Wellcome Chemical Works, Dartford, retired recently. Mr. Brown became a Freeman of the City of London in 1890, and was elected a Fellow of the Chemical Society in 1908.

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MR. FRANCIS D'ARCY COOPER, chairman of Lever Brothers and Unilever, Ltd., has resigned from the Prime Minister's advisory panel of industrialists on account of ill-health. It was announced in last week's issue that Mr. D'Arcy Cooper had undergone an operation on January 3 and that he would undergo a further operation shortly.

TO-DAY'S ANNIVERSARY

LUDWIG CLAISEN, born on January 14, 1851, can be remembered for his work upon tautomeric or desmotropic compounds. In 1896 his attempt to isolate the two desmotropic forms of a certain compound was successful, and he notably contributed to a better understanding of the phenomena of tautomerism and desmotropsy. These phenomena received enthusiastic study by chemical and physical methods when the respective terms were first suggested by Laar (1885), and by Jacobson (1887). Claisen explained the synthesis of aceto-acetic ester as being due to the formation of an intermediate ortho compound, and prepared β-diketones by the so-called Claisen condensation of ketones and acid esters in the presence of sodium or sodamide.

Foreign Chemical Notes

Czechoslovakia

AN ESSENTIAL OIL PRODUCING PLANT will be erected at the soapworks of the Biochema Company at Modrice.

Greece

A FIRM IN PIRAEUS is planning to manufacture wood charcoal from the residues of olive seed oil production.

Peru

ACCORDING TO A. TAPIA FRESE (*Bull. Soi. Quim. Peru*, *4*, 22), vitamin C in solution can be identified by the blue or green colour formed on addition of a solution of vanadium oxide in pure sulphuric acid.

Russia

THE FIRST 10 GRAMS OF METALLIC GALLIUM have been turned out in the laboratories of the Rare Element Research Institute.

PEAT WAX IS NOW BEING PRODUCED at the Redkinski Peat-Chemical Combinate, Redkino, in a plant with an annual output capacity of 300 tons.

Italy

A NEW CARBON BLACK PRODUCING COMPANY has been formed at Kattowitz under the style of "Gazosadza" Polska Fabryka sadzy gazowej Ing. W. Tenschert i S-ka.

DRY ICE IS NOW BEING PRODUCED at the rate of one ton per day from carbon dioxide-containing mineral waters near Krynica, situated some 2,000 feet below the surface.

Poland

A SECOND FACTORY FOR SYNTHETIC RUBBER PRODUCTION is under consideration owing to the inadequate capacity of the existing works.

RESEACH WORKERS AT THE WARSAW TECHNICAL HIGH SCHOOL have succeeded in developing a process for manufacturing aluminium oxide from native bauxite and china clay. If the process can be operated on the large scale it will probably mean abandonment of the recently proposed plans of the aluminium factories for utilisation of foreign bauxite.

Germany

STABLE SILVER HYDROSOLS exhibiting an intense bluish-green fluorescence are obtained according to R. Spychalski (*Kolloid-Beihefte*, *47*, 321) by reducing solutions of silver oxide with hydrazine hydrate.

TWO NEW METHODS FOR DETECTION OF VITAMIN C have been published. In that of Giri (*Mikrochemie*, *23*, 283), potassium ferricyanide undergoes reduction to the ferrocyanide which gives a reddish-brown coloration or a red precipitate with a 2.5 per cent. solution of ammonium molybdate in 5N sulphuric acid. The second reaction (Rosenthaler, *Zeitschr. für Vitaminforsching*, *7*, 126) consists of adding a few drops of a 0.2 per cent. cacotheline solution to the vitamin C solution when a violet colour appears after some time.

References to Current Literature

Inorganic

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Organic

Composition of starches and their technical properties. Samec, *Papier Fabrik. (tech. Teil), 36,* 495-497.

Inversion of sucrose. Leininger and Kilpatrick, *J. Amer. Chem. Soc., 60,* 2,871-2,899.

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Hydrogen fluoride as condensing agent: alkylation of benzene by olefines. Simons and Archer, *J. Amer. Chem. Soc., 60,* 2,952-2,953.

Catalytic activity of iron sesquioxide in the synthesis of hydrocarbons by hydrogenation of carbon monoxide. Le Clerc, *Compt. rend., 207,* 1,099-1,101.

Analysis

New methods of desorption gas analysis. Henjes, *Oel u. Kohle, 14,* 1,079-1,083.

Spectral analysis of metals. Lundgardh, *Metallwirts., 17,* 1,222-1,226.

Determination of acid in wool. Barritt, Bowen, Goodall and Whitehead, *J. Soc. Dyers Colourists, 54,* 566-573.

Oxidimetric determination of bismuth. Stamm and Goehring, *Z. analyt. Chem., 115,* 1-8.

Determination of small amounts of lead in zinc blende. Grote, *Z. analyt. Chem., 115,* 8-9.

Titrimetric determination of phosphoric acid. Gisiger, *Z. analyt. Chem., 115,* 15-29.

Volumetric process for tellurium. Evans, *Analyst, 63,* 874-875.

Determination of tin in bronze. Wheeler, *Analyst, 63,* 883-884.

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Volumetric oxidation of iodide and bromide by periodic acid. Willard and Greathouse, *J. Amer. Chem. Soc., 60,* 2,869-2,872.

Estimation of cobalt in presence of nickel. Sen, *J. Indian Chem. Soc., 15,* 473-474.

Analysis of sugar mixtures. Zerban and Sattler, *Ind. Eng. Chem. analyt. ed., 10,* 669-674.

Mineral Oils, Gas, Tar

Distinguishing natural from synthetic asphalt. Hefter, *Angew. Chem., 51,* 890-892.

Behaviour of hard coal on heating. Macura, *Oel u. Kohle, 14,* 1,097-1,107.

Separation of petroleum acids. Schutze, Quebedeaux and Lochte, *Ind. Eng. Chem. analyt. ed., 10,* 675-677.

Sediment content of fuel oil. Hulse and Thwaites, *Ind. Eng. Chem. analyt. ed., 10,* 678-680.

Combustion phenomena of higher hydrocarbons. Townend, *J. Inst. Fuel, 12,* 78-86.

Cellulose, Paper

Characterising cellulose by viscosity measurements. Staudinger and Reinecke, *Papier Fabrik. (techn. Teil), 36,* 489-495.

Chlorination of pine wood fibres. Jayme and Wettstein, *Papier Fabrik. (techn. Teil), 36,* 519-531.

Measuring the permeability of paper to various liquids, fats, etc. Beck, *Zellstoff u. Papier, 18,* 698-700.

Sizing by means of enzymatically decomposed starches. *Zellstoff u. Papier, 18,* 700-702.

Hydrolytic decomposition products of cellulose. Toth, *Z. Papier Pappe Zell. Holzstoff, 50,* 309-13.

Bleaching, Dyeing, Finishing

Neutral dyeing and its harmful effect on wool. Speakman and Coke, *J. Soc. Dyers Colourists, 54,* 563-565.

Alkylated celluloses in the finishing of cellulosic fabrics. Bonnet, *Teintex, 3,* 739-743.

New dye auxiliaries. Mosher, *Canadian Chem., 22,* 508-510.

Indigoid vat dyes of the isatin series. Guha, *J. Indian Chem. Soc., 15,* 501-508.

Metallic mordants in textile printing. *Text. Colorist, 60,* 807-809.

Progress in diazo chemistry. Wakelin, *Text. Colorist, 60,* 810-813, 850.

Glass, Ceramics

Optical glasses. Knapp, *Glass Ind., 19,* 465-468, 471.

Chemical and thermal properties of glass. Springer, *Korrosion u. Metallschutz, 14,* 381-385.

Metals, Electrometallurgy

Electrodeposition of chromium: trivalent metal salt solutions. Wade and Yntema, *Metal Ind., 53,* 641-642.

Electrodeposition of tin: stannous ammonium oxalate bath. Hothersall and Bradshaw, *Metal Ind., 53,* 643.

Tellurium lead for plating equipment. Hiers and Stiers, *Metal Ind. (U.S.A.), 36,* 563-566.

Amorphous state of metals. Schulze, *Metallwirts., 17,* 1,243-1,248.

Corrosion of metals in the soap and allied products industry. Cox, *Ind. Eng. Chem., 30,* 1,349-1,355.

Film inhibitors in industrial aqueous systems. Haering, *Ind. Eng. Chem., 30,* 1,356-1,361.

Platinum metals. Williamson, *J. Australian Chem. Inst., 5,* 407-416.

Treating cast iron with caustic soda. Joseph, Scott and Tenenbaum, *Metals and Alloys, 9,* 329-335.

Some ternary systems with aluminium. Hanemann and Schrader, *Aluminium (Germany), 20,* 771-774.

Fats, Oils, Waxes

Drying oil monoglycerides. Mundy, *Oil Colour Trades J., 94,* 1,801-1,803.

Fillers and extenders in the soap industry. Schulze, *Fette u. Seifen, 45,* 630-633.

Oxidation of linseed oil acids. Nunn and Smedley-Maclean, *Biochem. J., 32,* 1,974-1,981.

Paints, Pigments

Shellac in protective coatings. Gardner, *Fed. Paint Varnish Prod. Clubs Dig.,* 1938, 473-478.

Colloids in the paint and varnish industry. Moore, *Fed. Paint Varnish Prod. Clubs Dig.,* 1938, 479-493.

Hardness of paint varnish and lacquer films. Parker and Siddle, *J. Oil Colour Chem. Assoc., 21,* 363-390.

Rubber, Plastics, Resins

Rubber plastics. Barron, *Brit. Plastics, 10,* 377-379.

Homogenisation and standardisation of used rubber. Bocquet, *Rev. Générale Caoutchouc, 15,* 326-333.

Structure and properties of urea artificial resin adhesives. *Gelatine Leim Klebstoffe, 6,* 206-214.

Manufacture of foils from polymeric thermoplastic materials. Schlitt, *Kunststoffe, 28,* 317-319.

Plastometry of synthetic resins. Houwink and Heinze, *Ind. Eng. Chem. analyt. ed., 10,* 686-683.

Miscellaneous

Spray drying. Fogler and Kleinschmidt, *Ind. Eng. Chem., 30,* 1,372-1,384.

Heat transfer to boiling liquids. Rhodes and Bridges, *Ind. Eng. Chem., 30,* 1,401-1,406.

Fireproofing of wood. Hadert, *Chem. Ztg., 62,* 917-919.

General News

From Week to Week

AN INDEX to Volume XXXIX of THE CHEMICAL AGE (July to December, 1938), is published with this issue. It will be found between the last advertisement page and the inside back cover, and is easily detached for binding purposes.

SIR JOHN SIMON, Chancellor of the Exchequer, will be the principal guest at the annual dinner of the British Iron and Steel Federation at Grosvenor House on February 16.

MEMBERS OF THE PUBLIC HEALTH COMMITTEE of Kensington Borough Council are urging the exercise of some measure of control over the sale of hair lotions containing carbon tetrachloride following the Public Analyst's expressed opinion that it should be used only in a freely ventilated room. It is proposed that representations should be made to the Home Office and the Ministry of Health.

THE WILMINGTON WORKS OF G. AND T. EARLE, LTD., cement manufacturers, a subsidiary of Associated Portland Cement Manufacturers, may be closed down in the near future, according to a recent announcement of the company. The approaching completion of extensions to the company's works at Hope, Derbyshire, together with the seasonal decline in the demand for cement, may compel this action.

ANNOUNCING THE INSTITUTION of a guaranteed price system for Kauri gum, Mr. Sullivan, New Zealand Minister for Industry, stated that the Internal Marketing Department had assumed control and fixed minimum prices. The industry is declining owing to the decrease of supplies, faulty marketing and development of synthetic gums. The trade employed 6,000 in 1913, but only a few hundred are engaged to-day. There are now said to be great hopes for future development.

A NEW £1,000,000 FACTORY FOR THE PRODUCTION OF DURALUMIN, mainly for aircraft manufacture, is in course of erection on Lea Hall Estate, Birmingham, by James Booth (1915), Ltd., Argyle Street, Birmingham, who acquired for the purpose a site of 31 acres from the Birmingham Corporation at a purchase price of £23,000. The new factory will consist of five main blocks of single storey construction, and in addition, a smaller block of buildings, where the Air Ministry will carry out certain special processes, will be erected.

THE BRITISH THOMSON-HOUSTON CO., LTD., in reviewing their activities for the past year, report that they continue to show steady progress both in orders and in technical development. They mention that among the orders they have in hand is one for a large synchronous motor generator set which will form part of an installation in India for the production of chemicals and fertilisers. The motor will be rated 3,000 kW, 3,300 kVA, 375 r.p.m., 4,600 volts, 25 cycles, and will be of the salient pole type with Korndorfer auto-transformer starting equipment. The d.c. generator will be rated 3,000 kW, 11,000 amp. at 273 volts, this output being obtained with one commutator. The set will be connected to a battery of electrolytic cells used for generating the hydrogen required for part of the process in the production of fertilisers.

TOTAL EXPORTS OF CHEMICAL AND ALLIED PRODUCTS from the Anglo-Egyptian Sudan were valued at $3,846,500 in 1937, of which $3,639,000 was gum arabic, $71,900 senna, $46,600 beeswax, $29,500 soap, and $11,400 henna. Formerly soap was imported in rather large amounts, but in recent years local factories have been producing soap of a quality that compares favourably with imported cheap household soap, some of which was exported to Ethiopia and neighbouring countries. Imports of chemicals and allied products in 1937 were valued at $1,432,700, comprised chiefly of $187,800 worth of medicinals, $133,800 of perfumery and toilet preparations, $200,300 of household soap, and $1,800 of toilet soap, $119,700 of paints and varnishes, $13,400 of linseed oil, $54,700 of synthetic indigo, $80,000 of matches, $100,900 of essential oils, $71,100 of ammonium sulphate, and $132,500 of industrial chemicals.

THE D'ARCY EXPLORATION CO., LTD., has given up a further five of the licences granted to it under the Petroleum (Production) Act, 1934, covering areas in Sussex, Surrey and Kent, and aggregating 861 square miles.

ONE OF THE LARGEST FIRMS OF GLASS MANUFACTURERS in Czecho-Slovakia is negotiating for a factory site near Doncaster. It is stated that the firm intends to leave Czecho-Slovakia entirely and settle in Britain.

THE CO-OPERATIVE WHOLESALE SOCIETY proposes embarking on a £3,000,000 scheme which will include the erection of new factories, the modernising and extension of others, and distributive improvements in Manchester, London, Northampton and Cardiff.

THE INAUGURAL LECTURE of the Scottish branch of the Institute of Petroleum will be delivered at the North British Hotel, Edinburgh, on January 20, by Lieut-Col. S. J. M. Auld, O.B.E., M.C. D.Sc., who will speak on the "New Outlook on Lubrication."

THE DUKE OF GLOUCESTER has consented to be principal guest and speaker at the banquet to be given by the Government at the Mansion House, on February 20, to mark the opening of the British Industries Fair. The President of the Board of Trade, Mr. Oliver Stanley, will preside.

THIS YEAR'S FIRST ISSUE OF THE SUMMARY OF CURRENT LITERATURE, prepared by the Water Pollution Research staff of the Department of Scientific and Industrial Research has been published by H.M. Stationery Office, price 2s. net. It appears in similar form to previous issues, and contains 125 abstracts on water supplies, analysis and examination of water, sewage, trade waste waters, pollution of natural waters, and miscellaneous.

BRITISH TRADERS have been considerably perturbed by the decision of the New Zealand Government to restrict the Dominion's imports of many classes of goods. Imports of no fewer than 17 kinds of United Kingdom manufactures will be prohibited under the New Zealand Government's new Import Control Regulations, including matches, glycerine, porcelain, and soap.

THE FEDERATION NAZIONE FASCISTA DEGLI INDUSTRIALI DEI PRODOTTI CHIMICI of Rome has issued the 15th edition of a directory of the Italian chemical industry. The volume is divided into five sections, the first of which contains a list of Italian chemical firms and their products. The second lists the individual products and their manufacturers, and the third the products exported. The fourth and fifth contain indexes to the contents.

DESCRIPTIONS OF TWENTY-SIX OF THE PRINCIPAL FUNGI which cause decay in soft woods used commercially in Great Britain, notes on their economic importance, and a key by which they may be identified are contained in a Forest Products Research publication issued last week by the Department of Scientific and Industrial Research. ("The Principal Decays of Soft Woods used in Great Britain," published by H.M. Stationery Office, 2s. 6d. net.)

"THE CASUALTIES OF PEACE" is the title given to a striking supplement to the current issue of *Safety News*, the official journal of the National "Safety First" Association. The supplement sets out a typical month's list of fatal accidents occurring on the road, in industry and in every-day pursuits, in the fashion of a war time casualty list, in an endeavour to "disturb complacency by an announcement sensational in its dullness, and prove how great is the measure of the problem." Fatal accidents in industry claim nearly 200 victims each month, and the list of causes set out in the supplement provides valuable guidance as to how these accidents occur.

WORK on the production of divinyl synthetic rubber is said to be progressing well at the four plants in the region of Erewan (U.S.S.R.). Large quantities of alcohol used as a raw material are available and production is shortly expected to reach 70,000 tons per year. The production of a divinyl chloride, suitable for the manufacture of paints, is also under investigation.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

TREATMENT OF GLASS, ETC.—H. Johnston. 36814.

WETTING, ETC., AGENT.—E. M. Jablonski (née Hofmann). (Germany, Nov. 2.) 36672.

PROCESS FOR MOULDING COLLOIDAL MATTERS, ETC.—P. L. Mercier, and P. E. Leroy. (France, Dec. 20, '37.) 36599; (France, Nov. 22.) 36600.

LUBRICATION OF TEXTILE FIBRES.—Monsanto Chemical Co. (United States, Feb. 14.) 37018.

MANUFACTURE OF DICARBOXYLIC ACID ANHYDRIDES, ETC.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Holland, Jan. 4.) 36724.

TREATMENT OF HALOGENATED ORGANIC COMPOUNDS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, Jan. 10.) 37200.

PRODUCTION OF DRYING OILS.—Naamlooze Vennootschap Industrieele Maatschappij voorheen Noury and Van der Lande. (Holland, Dec. 18, '37.) 36963.

STEROL DERIVATIVES, ETC.—Parke, Davis, and Co. (United States, Dec. 23, '37.) 37061.

IMPARTING TO CELLULOSE ACETATE the quality of absorbing dyes, etc.—L. G. Ratner. 37128.

PROCESS FOR RECOVERING THORIUM from substances containing thorium and iron.—Ruhrchemie, A.-G. (Germany, Jan. 7.) 37085.

MANUFACTURE OF CYCLO-PENTANO-POLYHYDRO-PHENANTHRENE COMPOUNDS.—Schering, A.-G. (Germany, Dec. 22, '37.) 36822.

MANUFACTURE OF AROMATIC DERIVATIVES OF DIAMINES.—Soc. des Usines Chimiques Rhone-Poulenc, and P. Viaud. 36915.

MANUFACTURE OF VAT DYESTUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, Dec. 20, '37.) 36897; (Switzerland, Nov. 29.) 36898.

MANUFACTURE OF NITROGENOUS NAPHTHALENE DERIVATIVES.—Soc. of Chemical Industry in Basle. (Switzerland, Dec. 20, '37.) 36899; (Switzerland, Nov. 23.) 36900.

REDUCING POLYCARBONYL COMPOUNDS.—Soc. of Chemical Industry in Basle. (Switzerland, Dec. 24, '37.) 36901; (Switzerland, Nov. 17.) 36902.

DESTRUCTIVE DISTILLATION OF CARBONACEOUS MATERIALS.—J. L. Strevens, A. E. Waters, and E. W. Brocklebank. 37181.

PRODUCTION OF MOLTEN IRON, ETC.—W. H. A. Thiemann (Sachtleben, A.-G. für Bergbau und Chemische Industrie.) 36974.

RESIN EMULSIONS.—W. W. Triggs (Röhm and Haas Co.). 37004.

PROCESS FOR THE CONVERSION OF NORMALLY GASEOUS HYDROCARBONS INTO LIQUIDS.—Universal Oil Products Co. (July 29, '37.) (United States, July 30, '36.) 36763.

CONVERSION OF HYDROCARBON OILS.—Universal Oil Products Co. (Nov. 30, '37.) (United States, Nov. 30, '36.) 36829; 37209.

OLEFINE POLYMERISATION.—Usines de Melle. (France, Dec. 23, '37.) 36835; (France, May 9.) 36836.

MANUFACTURE OF SYNTHETIC LIQUID, ETC.—G. M. Wedard. (Italy, Dec. 18, '37.) 36588.

EMULSIFICATION OF TAR, ETC.—Woodall-Duckham (1920), Ltd., W. J. Chadder, H. M. Spiers, and E. Arnold. 37000.

OBTAINING OILS OF LOW POUR-POINT.—Aktiebolaget Separator-Nobel. (Germany, Jan. 4, '38.) 269.

PRODUCTION OF RESINOUS CONDENSATION PRODUCTS.—Beck, Koller, and Co. (England), Ltd. (United States, Feb. 2.) 37756; (United States, Nov. 10.) 37757.

MANUFACTURE OF ORGANIC COMPOUNDS.—Boots Pure Drug Co., Ltd., and W. F. Short. 37903.

SURFACE TREATMENT OF ALUMINIUM, ETC.—British Aluminium Co., Ltd., and A. N. D. Pullen. 24.

Complete Specifications Open to Public Inspection

INHIBITING THE OXIDATION OF OILS and other organic substances liable to oxidation by the air.—T. Sabalitschka. June 23, 1937. 229/38.

LUBRICATING OILS AND GREASES.—Standard Oil Development Co. June 22, 1937. 4036/38.

SULPHONATED TERPENYL ALKYL PHENOLS.—American Cyanamid and Chemical Corporation. June 26, 1937. 9170/38.

DETECTOR AND DETOXICANT for detecting or eliminating warfare chemicals, and process for its manufacture.—Chema Akciova Spolecnost. April 30, 1937. 11779/38.

PRODUCTION OF MEDIA for use in paints and the like.—Naamlooze Vennootschap Industrielle Maatschappij Voorheen Noury and Van Der Lande. June 26, 1937. 14223/38.

MANUFACTURE OF ANTI-KNOCK MOTOR-FUEL HYDROCARBONS.—Texaco Development Corporation. June 25, 1937. 16091/38.

PRODUCTION OF OLEFINE OXIDES.—U.S. Industrial Alcohol Co. June 24, 1937. 16693/38.

SYNTHETIC RESINS.—British Thomson-Houston Co., Ltd. June 25, 1937. 17066/38.

RESINOUS COMPOSITIONS.—British Thomson-Houston Co., Ltd. June 22, 1937. 17663/38.

PRODUCTION OF SYNTHETIC RESINS.—Kodak, Ltd. June 23, 1937. 17848/38.

MANUFACTURE OF CAST IRON in cupola furnaces.—Deutsche Eisenwerke, A.-G. June 21, 1937. 17925/38.

ELECTROLYTIC PRODUCTION OF ZINC.—I. G. Farbenindustrie. June 21, 1937. 17972/38.

PROCESS FOR THE MANUFACTURE OF AETIOCHOLYLGLYOXALS.—Schering, A.-G. June 21, 1937. 17978/38.

PROCESS FOR THE MANUFACTURE OF COMPOUNDS of the synthesis of the corpus luteum hormone.—Schering, A.-G. June 21, 1937. 17979/38.

MANUFACTURE OF DERIVATIVES OF CHRYSENE.—Soc. of Chemical Industry in Basle. June 21, 1937. 18394/38.

MANUFACTURE OF NITROGENOUS CONDENSATION PRODUCTS.—Soc. of Chemical Industry in Basle. June 21, 1937. 18400/38.

PROCESS FOR THE MANUFACTURE OF 1.7- ALDEHYDO-ANDROSTANES. Schering, A.G. June 21, 1937. 18483/38.

HARD ALLOYS.—Tool Metal Manufacturing Co., Ltd. June 21, 1937. 18485/38.

MOLECULAR CATALYTIC, or like exchanges.—Soc. Industrielle Des Carburants and Solvants. June 26, 1937. 18547/38.

DYESTUFF MIXTURES and application thereof.—Soc. of Chemical Industry in Basle. June 22, 1937. 18554/38.

LUBRICANTS and their manufacture.—E. I. du Pont de Nemours and Co. June 23, 1937. 18600/38.

EMULSIONS comprising tetra-ethyl-thiuram-monosulphide and their manufacture.—Imperial Chemical Industries, Ltd. June 22, 1937. 18601/38.

CAROTIN-DECOLORISING MATERIAL.—Standard Brands, Inc. June 26, 1937. 18641/38.

DULCITOL AND MANNITOL BORATES and salts thereof.—Atlas Powder Co. June 23, 1937. 18660/38.

LUBRICANTS and their manufacture.—E. I. du Pont de Nemours and Co. June 25, 1937. 18703/38.

MANUFACTURE OF VAT DYESTUFFS.—I. G. Farbenindustrie. June 25, 1937. 18841/38.

MANUFACTURE OF COMPOUNDS of the cyclopentanohydrophenanthrene series.—Soc. of Chemical Industry in Basle. June 25, 1937. 18990/38.

MANUFACTURE OF ACETYLENE DERIVATIVES of the cyclo-pentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. June 26, 1937. 18992/38.

BERYLLIUM ALLOYS.—Seri Holding Soc. Anon. June 30, 1937. 26811/37.

PYROLYTIC REFORMING OF HYDROCARBON OIL.—Universal Oil Products Co. June 30, 1937. 3146/38.

ALKALI-ALKALINE EARTH FERTILISER and a process of producing same.—Metallges, A.-G. June 30, 1937. 11752/38.

PROCESS FOR THE MANUFACTURE OF POLYSULPHIDES of organic bases and of their solutions.—C. Blank, H. Blank, A. von Anthropoff, and J. Friedrichsen. June 28, 1937. 13086/38.

PREPARATION OF P-ISOPROPYL-A-METHYL-HYDROCINNAMIC ALDEHYDE.—Soc. des Usines Chimiques Rhone-Poulenc. June 29, 1937. 13602/38.

INCREASING THE STABILITY TO LIGHT OF ARTIFICIAL SILK, artificial threads, or other artificial objects of cellulose or cellulose derivatives.—Soc. Rhodiaceta. June 28, 1937. 14582/38.

PROCESS FOR THE MANUFACTURE OF STRATIFIED BODIES from synthetic resins.—T. Goldschmidt, A.-G. June 29, 1937. 15205/38.

MANUFACTURING STEEL.—F. P. Mehta. June 28, 1937. 15293/38.

MANUFACTURE OF COPPER ACETO ARSENITE.—Chemische Fabrik von J. E. Devrient, A.-G. June 30, 1937. 18828/38.

PROCESS FOR THE MANUFACTURE OF SULPHUR TRIOXIDE.—Soc. des Produits Azotes. June 28, 1937. 18842/38.

METHOD OF TREATING ELECTROLYTIC COATINGS on magnesium and its alloys.—R. W. Buzzard. July 1, 1937. 18982/38.

MANUFACTURE OF OXIDATION PRODUCTS of the cyclopentanopolyhydrophenanthrene series.—Soc. of Chemical Industry in Basle. June 28, 1937. 18996/38.

PRODUCTION OF ALIPHATIC ACIDS OR ESTERS.—E. I. du Pont de Nemours and Co. June 26, 1937. 19057/38.

MANUFACTURE OF BLACK TRISAZO DYESTUFFS.—J. R. Geigy. July 1, 1937. 19296/38.

MANUFACTURE OF AZO-DYESTUFFS and intermediate products.—Soc. of Chemical Industrie in Basle. June 30, 1937. 19309/38.

MANUFACTURE OF BASIC NITROGENOUS COMPOUNDS.—E. I. du Pont de Nemours and Co. June 29, 1937. 19343/38.

OXIDATION OF HYDROCARBONS.—E. I. du Pont de Nemours and Co. June 29, 1937. 19344/38.

PREPARATION OF ALKALI PERCARBONATES.—Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. July 1, 1937. 19596/38.

PRODUCTION OF SOLUTIONS of low substituted cellulose ethers. E. I. du Pont de Nemours and Co. July 1, 1937. 19612/38.

ADSORPTION AND PURIFYING AGENT and means for producing same.—R. Adler. July 2, 1937. 19715/38.

UREA DERIVATIVES.—Imperial Chemical Industries, Ltd. July 2, 1937. 19805/38.

MANUFACTURE OF CYCLOPENTANOPOLYHYDROPHENANTHRENE DERIVATIVES.—Soc. of Chemical Industry in Basle. June 28, 1937. 19132/38.

CATALYTIC POLYMERISATION OF ACETYLENE.—E. I. du Pont de Nemours and Co. July 2, 1937. 19806/38.

MANUFACTURE AND APPLICATIONS OF AZO DYESTUFFS.—Imperial Chemical Industries, Ltd. July 2, 1937. 19807/38.

MANUFACTURE OF ETHERS from alcohols.—Standard Alcohol Co. June 6, 1936. 37758/38.

PROCESS FOR THE MANUFACTURE OF DERIVATIVES OF STEROLS.—Schering, A.-G. March 5, 1937. 37772/38.

Specifications Accepted with Date of Application

TREATING TEXTILES and oils therefor.—Lister and Co., Ltd., and W. Gardner. April 20, 1937. 497,574.

METHOD OF FORMING RUBBER SUBSTITUTES by polymerisation of halogen-2-butadienes-1, 3.—E. I. du Pont de Nemours and Co. March 19, 1936. 497,420.

METHOD OF POLYMERISING A HALOGEN-2-BUTADIENE-1, 3.—E. I. du Pont de Nemours and Co. March 19, 1936. 497,638.

METHOD OF STABILISING PLASTIC POLYMERS of halogen-2-butadienes-1, 3.—E. I. du Pont de Nemours and Co. March 19, 1936. 497,421.

INTERPOLYMERISATION OF ETHYLENE with other organic compounds.—M. W. Perrin, E. W. Fawcett, J. G. Paton, E. G. Williams, and Imperial Chemical Industries, Ltd. April 22, 1937. 497,643.

COATING OF ALUMINIUM or aluminium alloy articles.—Aluminium Colors, Inc. July 3, 1936. 497,648.

DYEING WITH VAT OR SULPHUR DYESTUFFS, and levelling or stripping vat or sulphur dyeings.—Chemical Works, formerly Sandoz. June 15, 1936. 497,482.

CHLORINE DERIVATIVES OF ETHYLBENZENE and their manufacture. E. I. du Pont de Nemours and Co., A. A. Levine, and O. W. Cass. June 15, 1937. 497,581.

CONVERSION OF THE ACETYLENE LINKAGE into an ethylene linkage. G. W. Johnson (I. G. Farbenindustrie.) June 16, 1937. 497,427.

MANUFACTURE OF SUBSTITUTED ACID AMIDES.—R. J. W. Reynolds, E. E. Walker, and Imperial Chemical Industries, Ltd. June 17, 1937. 497,485.

PRODUCTION AND USE OF CATION-EXCHANGE MATERIAL.—Auxiliaire des Chemins de Fer et de L'Industrie, and G. V. Austerweil. April 23, 1937. 497,708.

APPLICATION OF BASE EXCHANGES as additional products to soils and fertilisers.— Auxiliaire des Chemins de Fer et de L'Industrie, and G. V. Austerweil. April 23, 1937. 497,709.

APPLICATION OF HALOGENATED VINYL POLYMERIDES in the plastic art.—W. W. Groves (Deutsche Celluloid-Fabrik). June 19, 1937. 497,429.

MANUFACTURE OF FLEXIBLE ARTICLES from synthetic resins.—E. I. du Pont de Nemours and Co. June 20, 1936. 497,596.

MANUFACTURE OF AROMATIC COMPOUNDS alkylated in the nucleus. I. G. Farbenindustrie. June 23, 1936. 497,487.

MANUFACTURE OF 2-ALKYL-TETRA-HYDROBENZTHIAZOLES and 2-alkyl-tetra-hydrobenzselenazoles.—I. G. Farbenindustrie. July 29, 1936. 497,659.

PRODUCTION OF 2-*p*-DIOXANONE.—Carbide and Carbon Chemicals Corporation. July 1, 1936. 497,668.

PROCESS FOR THE MANUFACTURE OF ARALKYLETHERS of high molecular carbohydrates.—A. Carpmael (I. G. Farbenindustrie.) June 23, 1937. 497,671.

PREPARATION OF PIPERAZINE.—Carbide and Carbon Chemicals Corporation. July 7, 1936. 479,679.

SEPARATION OF SOLID SUBSTANCES from oil residues.—G. W. Johnson (I. G. Farbenindustrie.) July 21, 1937. 497,607.

PROPERTIES OF THERMOPLASTIC, film-forming, organic substances. G. W. Johnson (I. G. Farbenindustrie.) July 26, 1937. 497,689.

PRODUCTION OF COMPOSITIONS OF METALS and metal oxides.—W. P. Williams (Richardson Co.). Aug. 6, 1937. (Convention date not granted.) 497,610.

COLOURING RUBBER HYDROCHLORIDE SOLUTIONS.—Wingfoot Corporation. Jan. 26, 1937. 497,616.

DECOMPOSITION OF TITANIUM SALT SOLUTIONS by hydrolytic precipitation.—Titan Co., Inc. Nov. 6, 1936. 497,694.

PRODUCTION OF CHROMIUM COMPOUNDS of mordant dyestuffs soluble in organic solvents containing hydroxyl groups.—J. R. Geigy, A.-G. Feb. 6, 1937. 497,514.

MANUFACTURE AND PRODUCTION OF LUBRICATING OILS.—I. G. Farbenindustrie. April 24, 1937. 497,541.

WORKING-UP THE RESIDUES obtained in the distillation of levulinic acid.—Naamlooze Vennootschap Internationale Suiker en Alcohol Cie, International Sugar and Alcohol Co., I.S.A.C.O., and E. Farber. Aug. 4, 1937. 497,544.

EXTRACTION OF PALM OIL and similar vegetable oil.—A. Nyrop. May 2, 1938. 497,547.

MANUFACTURE OF NUCLEAR-ALKYLATED 6 : 6¹-dinitro- and 6 : 6¹-diaminostilbene- 2 : 2¹-disulphonic acids.—Soc. of Chemical Industry in Basle. May 19, 1937. 497,552.

MANUFACTURE OF AROMATIC COMPOUNDS alkylated in the nucleus. I. G. Farbenindustrie. June 23, 1936. (Divided out of 497,487.) 497,721.

PRODUCTION OF N-ACYLURETHANES.—J. R. Geigy, A.-G. July 12, 1937. 497,572.

METHOD OF POLYMERISING a halogen-2-butadiene-1, 3.—E. I. du Pont de Nemours and Co., and W. W. Triggs. March 19, 1937. 497,706.

METHOD FOR PREVENTING CORROSION or contamination by hydrogen sulphide produced by the action of sulphate-reducing bacteria. British Non-Ferrous Metals Research Association, S. G. Paine, and T. H. Rogers. March 19, 1937. 497,829.

SHAPED BODIES, such as thin sheets, threads, or the like, composed essentially of rubber hydrochloride, and methods of producing such bodies.—H. D. Minich. April 30, 1936. 497,788.

DEWAXING MINERAL OIL.—A. H. Stevens (Texaco Development Corporation). May 21, 1937. (Addition to 482,327.) 497,789.

PREPARATION OF TRANSPARENT RESINOUS PRODUCTS.—J. P. Fraser and H. Barnett. May 21, 1937. 497,929.

SEPARATION OF METALS or metal compounds.—W. H. Vale, jun. May 21, 1937. (Convention date not granted.) 497,835.

EXCHANGE OR ELIMINATION OF ANIONS IN LIQUIDS and the absorption of gases.—Auxiliaire Des Chemins de Fer et de L'Industrie, and G. V. Austerweil. May 21, 1937. 497,928.

Chemical and Allied Stocks and Shares

DESPITE the commencement of a new Stock Exchange account on Monday, the stock and share markets showed little, if any, increase in activity, the disposition being to await the outcome of the Prime Minister's visit to Rome. Nevertheless, movements in prices, although mostly against holders, were moderate in character and at the time of writing the rather lower prices are tending to attract buyers.

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Among shares of companies associated with the chemical and kindred industries Fison Packard and Prentice, although less active were again a steady feature and were maintained at 39s. Imperial Chemical have gone back from 30s. 9d. to 30s. The market is doubtful if the dividend on the last-named will be maintained at 8½ per cent. for the year, but is hopeful that at least 7½ per cent. will be paid, on which basis the shares at their current price would still give an apparently favourable yield. Turner and Newall have declined 1s. to 76s. 6d. and Lever and Unilever at 36s. 3d. are slightly lower on balance for the week. British Oil and Cake Mills preferred ordinary units had a steadier appearance at 41s. and were rather more active, attention being drawn to the favourable yield.

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British Aluminium, Murex, Reckitt and Sons ordinary and numerous other prominent shares were little changed, while J. and J. Colman remained firm at 73s. 6d. Associated Cement fluctuated and are lower at 66s. 3d. The dividend announcement of the latter company is due in March and the market is hopeful that 20 per cent. will be paid. For the previous year shareholders received 22½ per cent. British Portland Cement and Tunnel Cement shares were also lower on the week. British Plaster Board were little changed at 25s. 7½d. Dunlop Rubber fluctuated and were under the influence of current market dividend estimates, reference to which was made last week.

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Newton Chambers were firm at Sheffield where they were quoted at 42s. following news of the works extensions announced this week. Swedish Match remained around 29s. and Imperial Smelting were little changed at 11s. Tube Investments continued in request and were higher in price, while Stewarts and Lloyds were fairly steady, but numerous iron and steel shares were moderately reactionary following their recent improvement. Dorman Long are 26s., compared with 26s. 9d. a week ago and United Steel have gone back to 22s. 10½d. Colvilles were fairly steady on hopes that the dividend may be maintained at 8 per cent. Current market estimates of the dividend range up to 9 per cent.

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Pinchin Johnson were better at 23s. 9d. and International Paint moved up to 76s. 10½d. Indestructible Paint, Lewis Berger and Goodlass Wall were around the same prices as a week ago. Wall Paper deferred went back slightly to £32s. 9d., at which the yield is on the large side as last year's dividend was 12½ per cent. Triplex Glass were active, but Lancegaye Glass, British Indestructo Glass and United Glass Bottle shares attracted only moderate attention.

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Boots Pure Drug were in request and an earlier decline has been regained, the price at the time of writing being 39s. 9d., which is slightly higher than a week ago. Sangers were little changed at 21s. 6d., but Timothy Whites and Taylors have gone back from 23s. to 22s. 7½d. Oil shares were less active this week and mostly lower on balance, but "Shell," Royal Dutch and Lobitos Oilfields are now "ex" the interim dividends declared recently.

Weekly Prices of British Chemical Products

CONDITIONS in the general chemical market have followed an even trend during the past week with the volume of inquiry in most sections displaying a slight improvement. On the whole buying has been restricted to those chemicals normally receiving the regular call and business of this nature appears to have returned to average dimensions. Deliveries under existing contracts, although as yet not in full swing, are regarded as satisfactory for the period. So far as values are concerned quotations for most of the industrial chemicals continue on a steady basis. In the Coal Tar section there is still an absence of any substantial buying orders, activity being confined to transactions covering small quantities. A considerable improvement is reported in the volume of export deliveries under existing commitments and it is generally felt that this should pave the way for a flow of new contract business.

MANCHESTER.—The movements of chemical products on the Manchester market are getting back to normal although there is still some leeway to make up before conditions are where they were before the holiday interference. In most directions, however, contract deliveries during the past week have been on a moderate scale and a certain amount of new business has been reported, principally over short periods. The demand for textile chemicals has been about maintained, with an improving tendency in one or two directions. Prices are mostly on a steady basis. With regard to the tar product, there has been a moderate trade in benzol, toluol and pyridine, but in most other respects conditions have been rather quiet.

Price Changes

Rises: Benzol, crude (Manchester); Bleaching Powder (Glasgow).

Falls: Copper Sulphate (Manchester); Potassium Prussiate, yellow (Manchester); Sodium Perborate; Cresylic Acid, 99/100%.

GLASGOW.—The demand for general chemicals still continues rather quiet, both for home trade and export, but a gradual improvement is expected now that the holidays are over. Prices generally continue quite firm at about previous figures, with no important changes to report.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech, 80%, £30 5s. per ton; pure 80%, £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—Grey, £18 10s. per ton, d/d U.K. Fine white, 98%, £17 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8¼d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. SCOTLAND: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4½d. per lb d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—10d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0¼d. SCOTLAND: B.P. crystals, 1s. 0¼d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £19 5s. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 17s. 6d. to £4 17s. 6d. per cwt. according to quantity; in drums, £3 10s. 0d. to £4 2s. 6d.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£31 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £31 per ton, less 2¼% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £31 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.), 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip), 7s.; levig., 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38 10s.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5¼d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¼d. to 10¼d. per lb. SCOTLAND: B.P. Crystals, 10½d. MANCHESTER: B.P. 9¾d. to 11¼d.

POTASSIUM PRUSSIATE.—5¼d. to 6d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6d. to 6¼d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¾d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £36 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 11s. per ton.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags.

Soda, Caustic.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. **Scotland**: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

Soda Crystals.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

Sodium Acetate.—£19-£20 per ton carriage paid North. **Glasgow**: £18 10s. per ton net ex store.

Sodium Bicarbonate.—Refined spot, £10 15s. per ton d/d station in bags. **Glasgow**: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. **Manchester**: £10 15s.

Sodium Bisulphite Powder.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£27 10s. to £32 per ton. **Glasgow**: £1 11s. per cwt., minimum 3 cwt. lots.

Sodium Dichromate.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.

Sodium Chromate.—4¼d. per lb. d/d U.K.

4d. per lb. **Glasgow**: 4½d. net, carriage paid.

Sodium Hyposulphite.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. **Manchester**: Commercial, £11; photographic, £15 10s.

Sodium Metasilicate.—£14 5s. per ton, d/d U.K. in cwt. bags.

Sodium Nitrate.—Refined, £8 per ton for 6-ton lots d/d. **Glasgow**: £1 12s 0d. per cwt. in 1-cwt kegs, net, ex store.

Sodium Nitrite.—£18 5s. per ton for ton lots.

Sodium Perborate.—10%, £4 per cwt. d/d in 1-cwt. drums.

Sodium Phosphate.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

Sodium Prussiate.—4d. per lb. for ton lots. **Glasgow**: 4d. **Manchester**: 4¼d. to 5d.

Sodium Silicate.—£8 2s. 6d. per ton.

Sodium Sulphate (Glauber Salts).—£3 per ton d/d.

Sodium Sulphate (Salt Cake).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. **Scotland**: Ground quality, £3 5s. per ton d/d. **Manchester**: £3 12s. 6d.

Sodium Sulphide.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. **Manchester**: Concentrated solid, 60/62%, £11; commercial, £8 10s.

Sodium Sulphite.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

Sulphuric Acid.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

Tartaric Acid.—1s. 1¼d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. **Manchester**: 1s. 1¼d. per lb. **Glasgow**: 1s. 1½d. per lb., 5%, ex store.

Zinc Sulphate.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.

Barytes.—£6 to £6 10s. per ton, according to quality.

Cadmium Sulphide.—3s. 1d. to 3s. 4d. per lb.

Carbon Black.—3¾d. to 4 1/16d. per lb., ex store.

Carbon Disulphide.—£31 to £33 per ton, according to quantity, drums extra.

Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.

Chromium Oxide.—Green, 10½d. to 11½d. per lb.

Diphenylguanidine.—2s. 2d. per lb.

India-rubber Substitutes.—White, 4¾d. to 5½d. per lb.; dark 3¾d. to 4½d. per lb.

Lamp Black.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

Lead Hyposulphite.—9d. per lb.

Lithopone.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

Sulphur.—£9 to £9 5s. per ton. **Sulphur precip.** B.P., £55 to £60 per ton. **Sulphur precip. comm.**, £50 to £55 per ton.

Sulphur Chloride.—5d. to 7d. per lb., according to quantity.

Vermilion.—Pale, or deep, 5s. per lb., 1-cwt. lots.

Zinc Sulphide.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

Ammonium Sulphate.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939; November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

Calcium Cyanamide.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939; November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

Nitro Chalk.—£7 10s. 6d. per ton up to June 30, 1939.

Sodium Nitrate.—£8 per ton for delivery up to June 30, 1939.

Concentrated Complete Fertilisers.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

Ammonium Phosphate Fertilisers.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

Benzol.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. **Glasgow**: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. **Manchester**: Pure, 1s. 8d. to 1s. 8½d. per gal.; crude, 1s. per gal.

Carbolic Acid.—Crystals, 6¾d. to 7¼d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10½d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

Creosote.—Home trade, 3½d. to 4d. per gal., f.o.r. makers' works; exports 6d. to 6¼d. per gal., according to grade. **Manchester**: 3¼d. to 4½d. **Glasgow**: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¾d. to 6¼d.

Cresylic Acid.—97/99%, 1s. 6d. to 1s. 9d.; 99/100%, 1s. 9d. to 2s. 6d. per gal., according to specifications; Pale, 99/100%, 1s. 8d. to 1s. 10d.; Dark, 95%, 1s. 4d. to 1s. 5d. per gal. **Glasgow**: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. **Manchester**: Pale, 99/100%, 1s. 8d. to 1s. 9d.

Naphtha.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1d. to 1s. 3d. per gal., naked at works, according to quantity. **Glasgow**: Crude, 6½d. to 7¼d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

Naphthalene.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £10 per ton in 2-cwt. bags. **London**: Fire lighter quality, £3 to £4 10s. per ton. **Glasgow**: Fire lighter, crude, £6 to £7 per ton (bags free). **Manchester**: Refined, £12 to £13 per ton f.o.b.

Pitch.—Medium, soft, 30s. per ton, f.o.b. **Manchester**: 29s. to 30s. f.o.b., East Coast. **Glasgow**: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

Pyridine.—90/140%, 12s. to 13s. 6d. per gal.; 90/160%, 10s. to 11s. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. **Glasgow**: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. **Manchester**: 11s. to 13s. 6d. per gallon.

Toluol.—90%, 1s. 11d. per gal.; pure 2s. 3d. **Glasgow**: 90% 120, 1s. 10d. to 2s. 1d. per gal. **Manchester**: Pure, 2s. 3d. per gallon, naked.

Xylol.—Commercial, 1s. 11d. to 2s. per gal.; pure, 2s. 3d. to 2s 3½d. **Glasgow**: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

Calcium Acetate.—Brown, £6 15s. to £9 5s. per ton; grey, £8 5s. to £8 10s. **Manchester**: Brown, £8 10s.; grey, £10.

Methyl Acetone.—40.50%, £32 to £35 per ton.

Wood Creosote.—Unrefined, 6d. to 8d. per gal., according to boiling range.

Wood Naphtha, Miscible.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 3d. per gal.

Wood Tar.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.

Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.

Benzidine, HCl.—2s. 7½d. per lb., 100% as base, in casks.

Benzoic Acid, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

***m*-Cresol 98/100%.**—1s. 8d. to 1s. 9d. per lb. in ton lots.

***o*-Cresol 30/31° C.**—6½d. to 7½d. per lb. in 1-ton lots.

***p*-Cresol, 34-5° C.**—1s. 7d. to 1s. 8d. per lb. in ton lots.

Dichloraniline.—2s. 1½d. to 2s. 5d. per lb.

Dimethylaniline.—Spot, 1s. 7½d. per lb., package extra.

Dinitrobenzene.—7½d. per lb.

Dinitrochlorbenzene, Solid.—£79 5s. per ton.

Dinitrotoluene.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

Diphenylamine.—Spot, 2s. 2d. per lb., d/d buyer's works.

Gamma Acid, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

H Acid.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

Naphthionic Acid.—1s. 10d. per lb.

β-Naphthol —£97 per ton; flake, £94 8s. per ton.

***a*-Naphthylamine.**—Lumps, 1s. 1d. per lb.

***β*-Naphthylamine.**—Spot, 3s. per lb.; d/d buyer's works.

Neville and Winther's Acid.—Spot, 3s. 3½d. per lb. 100%.

***o*-Nitraniline.**—4s. 3½d per lb.

***m*-Nitraniline.**—Spot, 2s. 10d. per lb. d/d buyer's works.

***p*-Nitraniline.**—Spot, 1s. 10d. to 2s. 1d. per lb. d/d buyer's works.

Nitrobenzene.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

Nitronaphthalene.—9½d. per lb.; P.G., 1s. 0½d. per lb.

Sodium Naphthionate.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

Sulphanilic Acid.—Spot, 8¾d. per lb. 100%, d/d buyer's works.

***o*-Toluidine.**—10½d. per lb., in 8/10 cwt. drums, drums extra.

***p*-Toluidine.**—1s. 10½d. per lb., in casks.

***m*-Xylidine Acetate.**—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ELTON COP DYEING CO., LTD., Bury. (M., 14/1/39.) Dec. 24, series of £10,000 (not ex.) debentures, present issue £3,000; general charge. *£4,950. December 19, 1938.

RICHARD THOMAS AND CO., LTD., London, W.C., steel tinplate manufacturers. (M., 14/1/39.) December 29, £253,000 4½ per cent. redeemable prior lien mortgage debenture stock, part of an amount already registered. *£8,620,410. August 11, 1938.

Satisfaction

HADFIELDS (MERTON), LTD., Mitcham, varnish and paint manufacturers. (M.S., 14/1/39.) Satisfaction December 29, of debenture registered August 21, 1936.

Company Winding-up Voluntarily

GUISELEY SILICA CO., LTD. By special resolution. January 2 (members). (C.W.U.V., 14/1/39.) L. J. Rowley, Genefax House, Sheffield, liquidator.

Receiverships

FURMOTO CHEMICAL COMPANY, LTD., 1-3 Brixton Road, S.W.9. (R., 14/1/39.) A. E. Middleton, 18 Essex Stret, Strand, W.C.2, has been appointed receiver and manager, December 30, 1938, under powers contained in debentures dated February 7, 1930.

ARDAL, LTD., Worle, metal refiners. (R., 14/1/39.) A. Collins has ceased to act as receiver and manager. December 24.

Company News

Rona Laboratories, Ltd., have increased their nominal capital by the addition of £3,500, beyond the registered capital of £3,000.

English China Clays Sales Co., Ltd., have declared a dividend on the 7 per cent. cumulative preference shares for the half-year ended December 31.

Electrolytic Zinc Co. of Australia, Ltd., have declared a dividend of 6 per cent. on preference and ordinary shares for the half-year to December 31 (the same).

J. and E. Hall, Ltd., report for the year to September 30 a profit of £69,280, before charging £12,000 for income tax. Dividend 10 per cent. (7 per cent.).

Berry, Wiggins and Co., Ltd. (oil and bitumen refiners), have declared a final dividend of 5 per cent., making 10 per cent., less tax, for 1938 on "A" ordinary shares (the same).

J. M. Steel and Co., Ltd., chemical merchants and manufacturers, etc., have increased their nominal capital by the addition of £40,000 beyond the registered capital of £10,000.

The Distillers Co., Ltd., have declared an interim dividend of 7½ per cent., less tax, the same as for the previous year. For 1937-38 there was a final dividend of 12½ per cent. and a bonus of 2½ per cent.

Polak and Schwarz (England), Ltd., manufacturers of fruit, chemical and flavouring essences, etc., have increased their nominal capital by the addition of £19,000 in £1 shares, beyond the registered capital of £1,000.

Liebig's Extract of Meat Co., Ltd., earned profits of £448,360 in the year to August 31 last, an increase of £50,928. The ordinary dividend is maintained at 11 per cent., free of tax, and the carry forward is down from £217,435 to £207,113.

Savory and Moore, Ltd.—The agreement between Savory and Moore, Ltd., and Pharmaceutical Products, Ltd., which involves the purchase of part of the latter's undertaking by the former was approved on Tuesday by the shareholders of the two companies. In the case of Savory and Moore the increase of the capital by £160,000 was also approved.

New Companies Registered

W. Büsching Chemical Engineering Company, Ltd. 347,107.—Private company. Capital £5,000 in 5,000 shares of £1 each. To acquire any patents, licences and like rights, and to carry on the business of general engineers and contractors, metal workers, metallurgists, ironfounders, chemists, etc. Subscribers: Gerald J. Bowers, 6 The Walk, Hornchurch, Essex; Sidney R. Macaree.

White Tar, Ltd. 347,507.—Private company. Capital £100 in 100 shares of £1 each. To carry on the business of manufacturers or vendors of liquid cements, cement powders, liquid tars, etc. Directors: Richard Plischke, 28 Cavendish Mansions, Mill Lane, N.W.6; Gladys L. Verschoyle. Registered office: 32 Bourne Terrace, W.2.

Clayton (Ironbridge), Ltd. 347,178.—Private company. Capital £100 in 100 shares of £1 each. Objects: To acquire and turn to account any mines, quarries, mining rights, minerals, mineral substances and metalliferous land in Great Britain or elsewhere; to carry on the business of dealers in minerals; ironmasters, steel makers and platers, miners, smelters, engineers, chemical manufacturers, distillers, etc. Subscribers: Cyril J. Albutt, 25 Staithwaite Road, West Bromwich; Harry Hazlewood, 222 Tar Bank Road, Oldbury. Registered office: 15 Church Street, Oldbury.

The Bottling Trades Chemical Co., Ltd. 347,464.—Private company. Capital of £5,000 in 5,000 shares of £1 each. To acquire the business and assets of the Bottling Trades Chemical Company, Limited (incorporated in 1935); and to carry on the business of manufacturers of and dealers in all forms of machinery, apparatus and materials for milk, beer and mineral water bottlers, bottle washers and labellers, bottle stopper makers and dealers, manufacturers of and dealers in all forms of detergents, manufacturing, industrial, analytical, hydrological and consulting chemists; engineers, distillers of essences; druggists, drysalters, oil and colour men; manufacturers of and dealers in chemicals and chemical products, compounds, pigments, varnishes, etc. Subscribers: William Mitchell, 217 Hampton Road, Ilford; Douglas A. G. Hyall.

Forthcoming Events

London.

January 17.—Royal Institution. 21 Albemarle Street, W.1. 5.15 p.m. M. Polanyi, "An Introduction to Chemical Mechanics."

January 18.—Institute of Chemistry. School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. Professor E. J. Salisbury, "Chemical and Physical Factors Influencing the Distribution of Plants."

January 19.—Sir John Cass Technical Institute. Jewry Street, Aldgate, E.C.3. 7 p.m. S. Judd Lewis, "Spectroscopic Analysis."

The Chemical Society. Burlington House, Piccadilly, W.1. 8 p.m. Scientific meeting.

January 23.—Chemical Club. Whitehall Court. 8.15 p.m. Dr. Olaf Bloch, "Some Undeveloped Pictures."

January 24.—Northampton Polytechnic. St. John Street, E.C.1. 8 p.m. S. Wernick, "A Decade of Progress in the Electro-Deposition of Metals: Modern Plating Plant."

Royal Institution. 21 Albermarle Street, W.1. 5.15 p.m. M. Polanyi, "An Introduction to Chemical Mechanics."

Birmingham.

January 19.—Society of Chemical Industry. Chamber of Commerce Buildings, New Street. 7.30 p.m. R. S. Potter and H. H. Bagnall, "The Determination of Carbon Dioxide in Baking Powder and Self-Raising Flour."

January 23.—Chemical Society. Joint meeting with the Birmingham University Chemical Society. The University, Edgbaston. 5 p.m. Professor C. R. Harington, "Recent Synthetic Studies in Immuno Chemistry."

January 25.—Institute of Chemistry. Symposium: "History of Industrial Chemistry in the Midlands."

Derby.

January 18.—Institute of Fuel. Railway Institute Lecture Hall. 7.30 p.m. Dr. A. E. Dunstan, "Developments in Oil Refineries."

Glasgow.

January 16.—Institute of Metals. Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent. 7.30 p.m. G. W. Lacey, "The Development of Corrosion Resisting Aluminium Alloys."

January 20.—Society of Chemical Industry. Joint meeting with the Institute of Chemistry. Royal Technical College. 7.30 p.m. E. J. Schorn, "Recent Advances in Pharmaceutical Chemistry."

Hull.

January 17.—Hull Chemical and Engineering Society. Municipal Technical College, Park Street. 7.45 p.m. E. H. Hall "Alchemy, Ancient and Modern."

Leeds.

January 17.—Institute of Chemistry. Professor F. M. Rowe, "Advances in the Chemistry of Dyestuffs."

Liverpool.

January 20.—Society of Chemical Industry. Joint meeting with the Food Group. The University. 6 p.m. C. H. Lea, "The Deterioration of Fat in Foods."

Manchester.

January 20.—Society of Chemical Industry. Constitutional Club, St. Ann Street. 7 p.m. Joint meeting with the Society of Dyers and Colourists.